BRAITHWAITE'S RETROSPECT.

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THE

RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

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LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.,

AND

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SYNOPSIS,

(ARRANGED ALPHABETICALLY), CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, SHOWING AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS WITHIN THE HALF-YEAR.

AFFECTIONS OF THE SYSTEM GENERALLY.

ACTION OF THE SEPTINOUS POISONS ON THE PRODUCTION OF FEVER.—The following theory to account for the action of the poisons of contagious disease, especially in the production of fever, is new: Poisons exert their deleterious action through the property they possess of setting at liberty the oxygen of the blood in undue quantities in the extreme circulation. By way of experimental demonstration, Dr. Richardson took specimens of solutions of peroxide of hydrogen, and inoculated them with points of different organic poisonous animal substances,—viz., decomposing blood, pyæmia poison, pus, fibrine, and vaccine lymph. In the presence of all these bodies, oxygen began to be immediately liberated from the solution. Other organic substances—mucus, for instance—would not liberate oxygen, a fact which could be applied (as was shown by an experiment) for diagnosing mucus from purulent matter. Proceeding with his demonstration, Dr. Richardson charged blood with oxygen from the peroxide solution; then, by inoculating this blood and setting oxygen at liberty, he showed the temperature of the blood rose 4° Fahr. In his further observations, he explained that these organic disturbing substances are themselves decomposed in the process of the change they excite, and that they all seem to be derived originally either from fibrine or cellular tissue. The conclusion arrived at, and which was advanced admittedly as a theory in its present state, is that the fever producing poisons act in the way described by setting oxygen free in the blood in undue proportion. (Dr. B. W. Richardson, p. 1.)

AGUE NOT OWING TO MARSH POISON.—Ague is not owing to marsh poison. There is no such thing as marsh poison. All forms of intermittent fever are owing to chills after extreme

heat, and the reason they occur in marshy districts is, the rapid precipitation of moisture after sundown. But if a man sleep two feet above a marsh, provided he is perfectly warm in a good bed, he does not take fever. The generation of fever in districts perfectly devoid of soil, and in sandy districts, is explained by this hypothesis, but it cannot be on the theory of marsh poison. If there be such a poison as "malaria," we cannot absolutely guard ourselves against it; but, if it be true that the diseases attributed hitherto to malarious miasms are really due to severe chill after great heat or great exertion, we can arm ourselves against them. All that is necessary is to keep one's self warm at nights and carefully guard against chills. If this is done we may reside at Sierra Leone with impunity—taking care to warm the house with a stove during the wet season, and to wear flannel. (Drs. Oldham and Inman, p. 3.)

Gout from Lead Poisoning.—It is remarkable that not only is genuine gouty inflammation of the joints caused by lead, but of a necessity all the other usual concomitants of gout. Therefore, it is constantly observed that workers in lead not only have chalky joints, but have granular kidney, thickened blood-vessels, and the other changes constantly met with in gout, and which are almost synonymous with those of Bright's disease. (Dr. S. Wilks, p. 51.)

Rheumatic Fever.—*Non-Nitrogenous Diet.*—In Dr. Pavy's excellent work on food, Mr. Mahomet in some experiments on a non-nitrogenous diet found the urine became alkaline. He says: "The mode in which I gave the non-nitrogenous diet was as follows: Butter was melted in a jug placed in a water bath, and the liquid oil was poured off. Arrowroot cakes were made with a portion of this butter, and a little sugar was added. A good cook can thus make very agreeable cakes, which should not be in the least tough. These arrowroot cakes were eaten by my patients with great relish when buttered; they also took arrowroot jelly sweetened." On reading these statements it occurred to me that the effect produced upon the urine, viz., the great diminution in the amount of free acid and of urea, made it extremely probable that a non-nitrogenous diet might be advantageously employed in the treatment of rheumatic fever; for, as it is scarcely necessary to remind my readers, the urine in this disease contains a large quantity of urea and of uric acid, the index of an excess of nitrogenous matter undergoing more or less perfect oxidation in the system, The alkaline treatment neutralises this excess of acid not only in the urine but in the blood, and prevents its ill effects. (Dr. J. Andrew, p. 56.)

Cynara (Artichoke).—The common artichoke in the form of tincture and extract is a remedy of considerable value in rheumatic fever. As long ago as 1833 I published some cases treated with it, and ever since I have employed it with undiminished confidence. In a case recently treated the following form was used:—℞. Potassæ bicarb. ʒ j; aquæ camph. ad ℥viij; tincturæ cynaræ ℥j; syrupi papaveris, alb. ℥ ss. M. Two tablespoonfuls were ordered to be taken every four hours, with as much of the extract of cynara as would make two moderately sized pills. No other medicine has in my experience appeared to be so efficacious as cynara in rheumatism, acute or chronic, but I have frequently heard of its having failed in other hands; and I suspect the reason is that it is often prepared from leaves gathered at an improper time, when there is no medicinal virtue in the plant. The leaves should be gathered just before the top of the vegetable is fit for food, and whilst they are full of juice; if left until the top is cut off for cooking purposes and the plant begins to wither, no good will be derived from it, and, if given, it would be condemned as useless and inert. It is absolutely necessary to pay attention to the time the leaves are gathered, and to be careful in the preparation of the medicine; and it would be perfectly safe to increase the dose of the tincture gradually from one to four drachms should the case prove obstinate. (Dr. E. Copeman, p. 58.)

Rheumatism and Gout.—Trimethylamine.—The use of trimethylamine in rheumatism and gout was shown as long ago as twenty years since, by Dr. Awenarius, a Russian physician. It can be obtained from various sources. That sold by Ferris and Co., of Bristol, is obtained from herring-brine, and is a 20 per cent. solution. It may be prescribed in the form of mixture. My formula is this: ℞. Trimethylamini ♏iv. vel viij♏; syrupi zingiberis ʒ j; aquæ menthæ piperitæ ℥ j. Misce. Talis fiat modus, secundâ, quâque horâ sumendus. And, as supporting the probability of variation in composition, I have at different times found that the same results were obtained with a dose of two minims as with a dose of eight minims. Now, I give always four to eight minims, at first every hour or two hours, increasing the interval as the pains diminish and the case progresses. When all pain is gone I cease to give the remedy, and substitute, in most cases, quinine. Rarely have I to re-exhibit the trimethylamine, but I do so if pains recur. In the case of a coachman, aged 50, who was suffering from his seventh attack of gout, two minims of trimethylamine were given

every four hours. The pains ceased suddenly forty hours after the first dose, and he made a rapid recovery. (Dr. W. H. Spencer, p. 46.)

SCARLATINA.—*The Wet Sheet.*—By "the wet sheet" is not meant a cold wet sheet, but a hot one. This useful remedy affords the best external means for eliminating scarlatinal poison, and preventing destructive sequelæ. It promptly suppresses pyrexial heat and itching; produces sleep, with a soft secretive skin, more or less continuously; and enables the digestive organs to accomplish that great desideratum in the treatment of scarlatina—viz., absorption of highly nutritious food. It may be repeated, on the recurrence of the febrile paroxysm, two, three, or four times in twenty-four hours, the patient remaining enveloped from half an hour to an hour. Mothers and nurses who have witnessed its efficacy are most earnest in its repetition. My plan of procedure is to immerse a nightgown, slit up at the front, in hot water (half a pint to a pint), pure, or medicated with a drachm or two drachms of tincture of capsicum, or in the infusion of three or four pods; or in mustard-water, the clear supernatant fluid from a tablespoonful of mustard to a pint of water; extending the gown over the feet by means of a towel immersed in the same fluid, both to be well wrung out and suddenly applied, and the patient quickly packed in two blankets previously placed on the adjoining sofa or bed; another blanket, or two pillows, or an eider-down quilt covering all. The medicated packing is preferable in the incipiency, and at any other time to evoke the rash, and in cases of cerebral oppression, with pale skin, low pulse, and delirium. (Mr. J. Taylor, p. 29.)

SMALL-POX OWING TO THE GROWTH OF A FUNGUS.—Dr. Klein has made the interesting discovery that sheep-pox is owing to the growth of a fungus in the skin, and although a similar fact has not been demonstrated in the case of small-pox, yet the similarity of the two diseases renders a similar cause probable. In sheep-pox organisms of a distinctly vegetable nature, such as granules which proliferate and form necklaces, are found in the lymphatics about the third or fourth day. When the pock reaches the vesicular stage the vesicles are found to contain masses like those in the lymphatics, but with thinner filaments and smaller conidia. (Dr. T. L. Brunton, p. 13.)

TYPHOID FEVER.—The microscopic researches of Dr. Klein prove that typhoid fever really depends upon the presence of a fungus. His observations show that a vigorous absorption

of peculiar organisms, which are really fungi, takes place in the intestine over and around Peyer's patches and that these pass into the lymphatics and veins of the mucous membrane. (Dr. T. L. Brunton, p. 13.)

Antiseptic Treatment.—There can be no question as to the great advantage to be derived from the use of cold in reducing the heat of typhoid fever; and there can be but little question as to the dependence of the disease upon the growth of minute organisms, the nidus of which is the small intestines. If, whilst we avail ourselves of the advantages we obtain from the employment of cold we administer at the same time internally substances which arrest the growth or destroy the vitality of morbid germs, we shall then not only force the disease to run a favourable course, but also considerably shorten its duration. The subchloride of mercury and iodine are both powerful antiseptics. In typhoid fever this property of theirs can alone account for their special action, and for the early subsidence of the disease. Other antiseptics, such as the sulphate of quinine, dilute sulphuric acid, the chloride of aluminium, &c., find a suitable employment in typhoid fever, as they combine antiseptic and tonic properties. When in practice we apply these rational views, we find that typhoid fever is the most manageable of diseases. (Dr. H. Blanc, p. 26.)

"*Cold.*"—It is highly desirable that the members of our profession should be more generally impressed than they are at present, with the usefulness of the various modes of applying cold to the surface of the body in febrile cases, under certain circumstances; and that they should be prepared without hesitation to carry one or other of them out efficiently whenever this plan of treatment is indicated. This applies to typhoid in common with other fevers. On the other hand, to adopt a routine hydropathic treatment of any fever seems to me most objectionable. The cases in which the more severe methods of applying cold are indicated are those in which the temperature is already very high and remains so, or shows a tendency to rise rapidly, especially if at the same time there are signs of much nervous disturbance. Unquestionably this plan of treatment is not resorted to under these circumstances nearly so frequently as it ought to be. It is difficult to lay down any exact rule as to what temperature indicates the necessity for adopting it, but if it reaches to 106° F. and shows no tendency to fall, or, still more, if it continues to rise, this treatment deserves due consideration. Necessarily much will depend on the actual condition of the

patient, and every case must be thoroughly considered in all its features. The best method seems to me decidedly that of placing the patient in a tepid bath, and gradually cooling this. (Dr. F. T. Roberts, p. 20.)

Cold Water.—Dr. Brand (of Stettin) treats typhoid fever by maintaining the temperature of the body below fever heat. This treatment is based on the theory of fermentation. At the beginning of the disease—end of the first or beginning of the second week—the patient is placed up to his neck in a bath at the temperature of 68° F., and at once cold water (43° to 47° F.) is poured over his head; an important point, specially when cerebral symptoms are present. The following days, when doubtless the nervous system will be less excited, water at the temperature of the bath will suffice for the douche. The douche should be continued during a couple of minutes, the assistant will afterwards rub and shampoo under the water the limbs of the patient during some three or four minutes; the patient is then to be left quiet. By that time a transformation can already be observed in him. He was, perhaps, unconscious when placed in the bath; he now begins to complain, the tongue gets moist, the face assumes a more natural appearance, and the previous drowsy, stupid look gives way to an expression of astonishment and fear. After the patient has been some eight minutes in the bath, he is seized with a violent rigor; the teeth chatter, he pants for breath, and violent and repeated fits of coughing are followed by the expectoration of thick bronchial mucus. Frequently there is an involuntary stool. The patient by this time feels anxious, and endeavours to get out of the bath, but the physician must here more than ever remember Dr. Brand's aphorism: "The patient will shiver and chatter his teeth, but he must remain fifteen minutes in the bath." If the rigor appears early, the bath should last only fifteen minutes, and somewhat longer should the shivering appear later. Before removing the patient from the bath, the head-douche should be repeated. Taken out of the bath the patient can stand supported by the assistant. He is trembling with cold, his skin marbled, shaking like a leaf beaten by a strong wind. He is at once carried to his bed, and his shirt should be put on without previously wiping him. A woollen blanket has been prepared to wrap up his feet, the mattress and pillow should be sufficiently hard as not to be depressed by the weight of the body. A single sheet should be thrown over him in summer, a light blanket in winter. Next a cupful of tepid broth should be given to him, followed by a mouthful of good old wine. He

is then to be left perfectly quiet. The shivering will last from twenty minutes to nearly an hour. The cold baths are repeated about every third hour, day and night, until the temperature in the rectum measures only 101° Fahr. The patient's diet should be served tepid, and consist of milk, tea and milk, mutton and beef broth. Every half-hour he should drink a mouthful of iced-water, and where much prostration is present he should be allowed a little good wine before each bath. Cold-water enemas are also administered in some cases. The average mortality of six German physicians, who have thoroughly tried Brand's method, was seven per cent. only, whilst their previous experience of the disease had exhibited an average of twenty-three per cent. Up to 1868 Brand himself had treated 170 patients by cold baths and obtained 170 cures, and in the years 1870-71, he had 89 cases and 89 cures. (Dr. Brand, Dr. H. Blanc, p. 23.)

Digitalis.—Digitalis is of great use in the treatment of typhoid fever. It always produces a lowering of the temperature, either complete defervescence or remission. The first effect of digitalis on the temperature shows itself two days after administration, the lowest temperature is obtained on the following day, sometimes only on the fourth day after its administration. The lowering is generally progressive; sometimes it terminates by a more rapid fall. In some cases, there is a very rapid fall in the interval between two thermometric observations, from the evening to the morning, or from the morning to the evening. During the action of the digitalis, the temperature may rise again in the evening, often it is equal, or inferior to that of the morning. Defervescence, or the greatest remission, may occur in the evening. This defervescence, or greatest remission, lasts from a few hours to three days, the temperature then rises. In about two-thirds of the cases, it no longer rises to the same height as before the administration of the digitalis. The action of digitalis on the thermometric evolution of typhoid fever may be thus expressed, the temperature is lowered. Taking into account the descent, the minimum, and the reascent, it may be said that the duration of the influence on the temperature varies from three to twelve days, the average being seven days. These characteristics are explained by increase of tension and arterial tonicity. (Dr. Bernheim, p. 18.)

Diarrhœa of Typhoid Fever.—The use of astringents, especially opiate injections, to arrest the diarrhœa of typhoid is not successful in practice, as distension of the bowels with gases and putrid contents results, and the risk of fatal perforation

is increased. As a rule no medicines of any kind are required in typhoid fever except an occasional dose of chloral to procure sleep, and a tonic during convalescence. The patient should be fed mainly with milk, with the addition of beef-tea and two raw eggs in the twenty-four hours, and wine or brandy should be given in quantities varying according to the urgency of the symptoms of exhaustion, especially in the advanced stages of the disease; but in many of the milder cases, and especially in the case of children, no alcoholic stimulants are required from the beginning to the end of the case. (Dr. G. Johnson, p. 16.)

Typhus and other Fevers.—*Digitalis.*—The following conclusions have been arrived at as the result of the use of digitalis as a heart stimulant, and a comparison of its effects with those of alcohol. 1. That in the treatment of fever, typhus and other forms, too much reliance has been placed on *alcoholic* stimulants, and that fashion, rather than reason, has swayed many in their *indiscriminate* employment. 2. That the per-centage of cases requiring such stimulants is a low one; and that while our administration of them, as regards quantity and kind, must depend entirely on the condition of the *patient*, still the utmost caution (with our present knowledge of their physiological action) is required. 3. That in digitalis we have a powerful cardiac stimulant, which, while it gives force to the heart, does not do so at the expense of the system, but rather as a conservative agent, which controls expenditure and limits waste of vital action—always, of course, remembering that a large number of cases will recover without any specific treatment, save that care and guidance which provides for the wants of the system, and secures the patient from the risks of complications. That digitalis appears to be indicated in the early periods of many cases of typhus in which we have a rapid pulse and high temperature range, regulating our administration, by its effects on both, using it, rather, with the object of guiding the patient up to a certain point, than of curing the disease. (Dr. H. Macnaughton Jones, p. 13.)

AFFECTIONS OF THE NERVOUS SYSTEM.

Opium Poisoning.—*Green Tea as an Antidote.*—A woman had taken fourteen drachms of Battley's sedative solution of opium in seven hours to procure relief from agonising pain. The following was the condition she was found in: Com

perfect; pupil contracted to a pin's point; perfectly cold up to the hips and elbows; face drawn and cadaverous; pulse imperceptible; *respiration two in three minutes.* This state of things is verified by one of my colleagues, who considered the case hopeless, and allowed me to administer what I pleased, saying she had not ten minutes to live. In the meantime, I had prepared the strongest possible infusion of green tea, and shortly after twelve I administered, *per rectum*, half-a-pint, my friend and I watching the result. In twenty-five minutes, the pulse at the wrist became perceptible; the face was less pale; and she *breathed six times in a minute*, instead of twice in three miuutes. The same quantity of tea was then given, also by injection; and, to make a long story short, at 4 a.m., four hours after the commencement of the attack, she addressed me by name, saying, "she could not see me, but that she recognised my voice;" at 8 a.m., she was out of danger. I have since had three cases of poisoning by alcohol in children, aged one year, five years, and six years. In the two latter, the coma was complete, but all were restored to consciousness in an hour or less. (Dr. J. Hughes Bennett, p. 301.)

Poisoning by Strychnia.—In a case of poisoning by strychnia, in which it seemed evident that poison sufficient to cause death had already been absorbed, thirty grains of chloral were administered by the mouth. In a few minutes an hypodermic injection of other thirty grains was given, and almost immediately afterwards a decided change for the better was observed. Some time afterwards this had to be repeated, as the fits again began to increase in frequency. (Dr. Ogilvie Will, Edin. Med. Jour., April, p. 907.)

Tic Douloureux.—*Calabar Bean.*—Believing that in tic the blood-vessels of the part affected are in a state of contraction, I have made use of the bean in several cases with exceedingly satisfactory results. The best plan of using the remedy is to introduce two drops of a solution of the extract (1 in 40) into the eye on the same side as the pain. The action of the Calabar bean being purely local renders it preferable to that of croton cloral, which, however, may be subsequently tried if necessary. I am quite hopeful that anyone giving Calabar bean a fair trial will find it a useful and safe immediate remedy for tic, leaving time, in cases requiring such treatment, for the use of quinine and iron, or other medicines calculated to have a permanent effect. For my own use, I intend to obtain, if possible, stronger gelatine squares, that being, in my opinion, the most convenient mode of application, being easily applied and certain in

action. The idea is a very ingenious one, and does great credit to the inventor. (Dr. W. Munro, p. 61.)

TOOTHACHE.—Let the patient hold in the mouth a little solution of bicarbonate of soda. No explanation can be given of its action; but in the case related immediate relief was given. (Dr. D. Duckworth, p. 65.)

AFFECTIONS OF THE CIRCULATORY SYSTEM.

HEMORRHAGES.—*Hypodermic Injection of Ergotin*—Pure ergotin when kept covered in a porcelain pot, will keep for any length of time; but when liquefied with water it soon loses its active properties and becomes inert. Three grains is the proper dose to inject, and this amount can be readily dissolved in ten minims of warm water. Badly and carelessly prepared ergotin is liable to do harm when administered hypodermically. Ergot has long had the reputation of being a styptic, and if its physiological action of inducing contraction in the involuntary or non-striped muscular fibre was more generally known and acted upon, its sphere of usefulness would be very greatly extended. A man twenty-eight years of age, had suffered from repeated attacks of epistaxis. On two occasions his posterior nares had been plugged, but with little benefit. The day he presented himself at the Infirmary the hemorrhage was copious, apparently coming from both nostrils, and he had then been bleeding for half an hour. I injected five grains of ergotin dissolved in twenty-five minims of water into his forearm; in less than four minutes hemorrhage had entirely ceased. In two cases of hæmoptysis four and five grains were respectively injected with the effect of completely and permanently arresting it. (Dr. W. J. Cleaver, p. 308.)

NÆVUS.—*Electrolysis.*—For the treatment of nævus by electrolysis, I use Stöhrer's and Meyer and Meltzer's continuous batteries, and judge according to the size of the nævus how many cells to use—six or eight is about the average if the battery is in good working order. If the nævus is small I use one or two needles attached to the negative pole, and one to the positive, and pass them into the tumour; but if large, I put on several needles in the negative cord, and use charcoal point with the positive. After the needles have been in the tumour a short time decomposition begins to take place; this is shown by bubbles of gas passing by the side of the needles. A clot is then formed, the tumour turns of a bluish white, and in this clot fibrous degeneration takes place, and ultimate cure is the result. The advantages of the

galvanism are its certainty of action, its safety, the faintness of the cicatrix, and the cessation of pain directly the operation is over. I have used every other method, and I certainly think this by far the best. (Mr. S. J. Knott, p. 167.)

Popliteal Aneurism.—Those are the most promising cases for the success of the compression-treatment in which the symptoms are not urgent or rapidly advancing, in which there is a strong sac and a certain amount of fibrine already deposited, and where the character of the bruit and of the pulsation points to the conclusion that the aneurism is not fusiform. And in cases where the presence of other general complications renders the surgeon anxious to avoid the risks attending a serious operation, we know that compression has very often succeeded. Pressure does sometimes succeed after prolonged perseverance, but usually, I believe, it fails ultimately when during the first few days it has not, at least so far, succeeded as to ameliorate the patient's condition, to diminish the size of the tumour and the strength of its pulsations, and produce some enlargement of the collateral vessels. The evidence up to the present time leads to the conclusion that a patient is not more but less likely to recover from ligature of the femoral if a prolonged application of pressure has previously been made. The general conclusion would be that it is better, after a careful but very moderate trial of the compression treatment, to abandon it, if it does not seem to be doing good, and to resort to the ligature before the patient's chance of recovery from that operation has been permanently impaired. (Prof. T. Holmes, p. 156.)

We have in the Hunterian operation a method which almost always succeeds, if the patient recovers from the operation; and which may be expected confidently to be followed by recovery in the very large majority of cases, especially if the dissection be skilfully and carefully conducted, so as to avoid all violence to the vein and all unnecessary exposure or contusion of the artery.

As far as they are to be learnt from our table, the results of the compression-treatment of popliteal aneurisms may be thus expressed:—Compression was tried in 66 cases with success, and in 58 cases without success. Of these latter, the artery was afterwards tied in 44; amputation was practised in 8. Death occurred in one case. In 4 cases there is no evidence of any subsequent treatment, though in one of them, which occurred at St. George's Hospital, it is believed that the femoral artery was afterwards tied with success at

St. Bartholomew's. Finally, one case is left in which the aneurism had recurred after apparently successful ligature. Pressure in all its forms was now tried and failed; but manipulation seemed to produce consolidation, at any rate for the time. It seems certainly at first sight a discouraging fact that pressure should have failed 58 out of 124 times—that is about as often as it succeeded. But I am not prepared to admit that this result furnishes any valid argument against the treatment. Seeing that pressure may cure, and is unattended with risk, it certainly ought to be tried before ligature of the artery is determined upon, for the patient is placed in no worse position thereby even if it does not succeed. However favourably the operation of ligature of the femoral artery may proceed, it must always involve considerable danger. (Prof. T. Holmes, p. 158.)

Popliteal Arterio-Venous Aneurism.—In a case of this kind the author tied both the artery and vein with success. The result of the operation tends to prove that surgeons have taken a too serious view of the risks likely to follow the ligature or obstruction of the principal artery and vein of a limb. One principle in all former operations for the relief of arterio-venous aneurism has been to avoid any interference with the vein, but this case has now practically demonstrated that both artery and vein may be successfully ligatured. Should carefully-applied compression fail to relieve an arterio-venous aneurism, recent experience inclines him to advocate the operation performed in the present instance, provided the case be one otherwise suitable for an operation. The advantages of this plan are, (1) certain closure of the openings of communication in both artery and vein; (2) absence of any risk from venous hemorrhage or absorption in connexion with the wounded vein; (3) its practicability in the large majority of cases; (4) its easy performance without much dissection. By the employment of the antiseptic treatment, all local irritation in connexion with the sac and wound was prevented, and suppuration was limited to the single discharge of a few drops of innocent pus. (Mr. T. Annandale, p. 163.)

Tapping the Pericardium.—In cases of pericarditis with great effusion, failure of pulse, and rapid respiration, the pericardium may be tapped with great advantage. An aspirator needle, the aspirator being exhausted, is to be passed in the intercostal space between the fourth and fifth ribs, two inches to the left of the central line of the sternum. Directly the pericardium is penetrated, as shown by fluid freely passing into the aspirator, the point of the needle is

to be pressed up against the chest wall as closely as possible. In a case which is related in detail, the fluid flowed freely to 14 ounces. (Mr. T. H. Bartleet, p. 66.)

Varicose Veins.—*New Operation.*—In a case of large tortuous veins below the knee, after standing for half an hour with a carbolised cloth round the left leg, the patient was put under chloroform, and I then marked on the skin with ink the course of the tortuous vein below the left knee for about nine inches. At each end of this mark I ligatured the vein by means of a pin passed under the vein, with a piece of bougie and a figure-of-8 suture over the vein; two other similar ligatures were placed above the upper one at distances of two inches apart, and a fifth ligature was placed two inches below the lower one. The pins, bougie, and threads had all been previously carbolised. Esmarch's elastic bandage was then applied to the whole limb, with the effect of completely emptying the varicose vein, even in the intervals between the several pins. I then made a straight incision through the skin from the top to the bottom of my tortuous ink-mark, and, with a director and knife, slit up the vein along the whole of the exposed portion. As the vein then formed a very large, irregular, folded mass at the bottom of the wound, I passed a ligature round it above and below, and *removed it entirely* with forceps and scissors, cutting through two large veins opening into it. A strip of carbolised gauze was then placed in the wound, and the limb put up in the complete antiseptic dressing. The operation was done under the carbolised spray. I may here observe that there was *no bleeding whatever* during the operation. (Mr. J. Marshall, p. 170.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

Bronchitis.—*Digitalis.*—Given a patient past the meridian of life, either very stout, or emaciated from previous bad health, and let him, or more commonly her, have a neglected bronchitis, and we have the following class of symptoms produced: A perspiring skin, a poor and quick pulse, urgent dyspnœa, bluish tinge of lips and skin, and respiration accompanied by loud wheezing sounds. The most successful plan of treating these cases, so common during the severe winter, is the free administration of digitalis, which may be advantageously combined with the compound spirit of ammonia. The digitalis may be given in doses of ten minims of the tincture every two hours. In less urgent cases, the pills recommended by Dr. Fothergill, in his Hastings prize

essay, are very useful, and have the advantage of less easily inducing sickness than the tincture. In these cases, it is the heart which is at fault, the right ventricle being gorged with blood, which it is unable to propel through the lungs. The best test of the truth of this theory is its success, for the pulse will be found to become full and slow, and the breathing relieved, directly the digitalis has had time to act on the heart. Its action is sometimes assisted by the judicious administration of a little alcohol. I prefer common gin. If, however, it be found that these cases of commonly called bronchitis are really dependent, for their non-recovery at least, upon weak hearts, care must be taken as to the administration of stimulants, for they accelerate the action of the heart, and in the end weaken it. In fact, digitalis slackens the speed, and stimulants increase it, so they to some extent contradict each other. (Dr. J. Braithwaite, p. 69.)

Bronchocele.—*Division of the Isthmus to relieve Dyspnœa.*—When the isthmus of the thyroid gland is enlarged, there is often dangerous dyspnœa. The hypertrophied part becomes firmly adherent to the trachea and the lateral lobes extend around it. In a case of this kind, in which no relief could be otherwise obtained, after chloroform had been given, an incision was made through the integuments in the median line over the trachea, about two inches long, the superficial fascia and then the deep were divided on a director, and, finally, the surface of the tumour was exposed, which in size approached that of a flattened walnut. The isthmus on either side of this was more slender and smaller in bulk than the tumour, which permitted of a strong ligature being placed on either side of it with the aid of an aneurism needle. The isthmus was then freed to the inner side of each ligature, divided, and wholly removed, the trachea being observed to be quite free. The patient soon left the hospital, feeling no inconvenience about the trachea on breathing or swallowing. (Sir G. Duncan Gibb, p. 175.)

Chronic Winter Cough.—*Iodide of Potassium.*—The one distinct and indisputable action of iodide of potassium which I have noticed is that of *stimulating the mucous membranes;* thereby influencing their action and promoting their secretions. In a person suffering from an attack of chronic winter cough, the first symptoms are great difficulty in breathing, amounting to a sense of suffocation; hard, dry, racking cough, which the patient says he cannot subdue; while he expresses a belief that relief would be obtained if something could be brought up. The suffocation complained of has been attributed to a swollen state of the air-passages,

obstructing the respiration; but there is a fair probability that the dry congested condition of the membranes is unfavourable to the interchange of gases requisite for blood-aëration, and the situation of the patient such that, however he may fill his lungs, his sufferings remain unrelieved. Whatever the actual state of matters at this point, certain it is, that as soon as expectoration sets in, the breathing is improved; and although the disease has by no means gone, the patient is so far better. Many hours of severe suffering may be obviated by taking advantage of the power of iodide of potassium to restore and promote the secretion of the bronchial membranes, thereby greatly relieving the congested blood vessels, producing comparative tranquillity of breathing, and getting the patient over the first stage of the disease much sooner than he otherwise would. (Dr. J. Lawrie, p. 299.)

Diphtheria.—When a case of diphtheria occurs in a house without evidence of importation from without, still more when several cases occur together or in quick succession, there will be good reason to suspect that sewers, cesspools, or contaminated water may be the source of the disease. My belief is that in a very large proportion of cases there is as close a relation between diphtheria and insanitary conditions as exists between typhoid fever and similar insanitary conditions; and I scarcely need say that if this be so the general recognition of the fact is of the greatest importance with reference to the adoption of preventive measures. There is reason to believe that much more harm would result from ignorance of the filth origin of diphtheria than from practically ignoring its infectiousness. Many instances have come to my knowledge in which fetid fæcal emanations have appeared to be the direct cause of diphtheria. It is notorious that in the houses of some of the most exalted and wealthy, and in open country districts, the sanitary defects which originate such diseases as diphtheria and typhoid fever are almost as common as in the meanest cottages and in the most crowded cities. (Dr. G. Johnson, p. 31.)

During an extensive epidemic of this disease which occurred at Aylsham, in 1868, the local treatment I adopted in every case was the application of tincture of iodine (forty-eight grains to one ounce) to every part of the throat covered with membrane at least once in twenty-four hours, and the inhalation of iodine vapour mixed with steam, but more especially the latter, if the larynx were invaded. If the membrane were firm in texture, and not too strongly adherent, I always removed it and applied the tincture of iodine to the denuded

surface, and with the best results; for, although frequently the membrane would re-form, yet it never regained its pristine condition. If the membrane were in specks or shreds, I applied the iodine over them, and in general half-a-dozen applications were all that was required to procure their dismissal, and in several instances two applications were sufficient. The general treatment was supporting and stimulating throughout. A liberal supply of beef-tea, wine, and milk was frequently and regularly given, to maintain the system against the natural tendency to depression and exhaustion. In medicine I rely upon chlorate of potash and tincture of steel, from three to five grains of the former with five to fifteen minims of the latter every four hours, according to age. When tracheal symptoms arise, I at once have recourse to the inhaler, beginning with ten drops, increasing to a drachm of the common tincture of iodine to a pint of boiling water, and letting the patient inhale as frequently as possible. In using this, one precaution is necessary, and that is not to begin with too large a supply of iodine, otherwise it is too irritating, causing the patient to cough, and making him unwilling to use it. I have found ten drops well borne to to begin with; and, after a short time, we may gradually increase the quantity to a drachm to the pint without inconvenience. (Mr. T. Prangley, p. 38.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

Exploration of the Abdominal Cavity in Extreme Cases of Obstruction of the Bowels.—It is probable that further experience will teach us that we may use great freedom in dealing surgically with the peritoneum, in cases in which the patient has hitherto been abandoned to his fate. Ovariotomy has taught us that a peritoneum altered by recent or remote inflammation can bear exposure, handling, and cleansing, in a manner truly astonishing. In cases of strangulated hernia, how frequently is not the healthy peritoneal cavity opened and explored with impunity; several inches and even coils of intestine being handled and sponged, and returned into the abdominal cavity. In a case of obstruction of the bowel which promised to terminate fatally, and in which the seat of obstruction was merely surmised, the abdominal cavity was opened by an incision five inches in length, made in the middle line below the umbilicus. The seat of obstruction

was ascertained, and left lumbar colotomy was performed with complete relief, as the disease of the bowel could not be removed, being a hard mass firmly attached to it, and obstructing its calibre. The patient made a rapid recovery. (Mr. T. P. Teale, p. 70.)

Fissure of the Anus.—Our surgical treatment acts just in this way—viz., by putting the parts at rest. This is accomplished by either of two methods: over-distending the sphincter, paralysing it for a time by means of the fingers, or dividing the muscle with the knife. Over-distension is now perhaps more frequently done in this city, certainly in this hospital. When you use the fingers, which I think are far better than an instrument, you place your two thumbs well into the rectum, so as to include the whole of the sphincter, and then grasping the buttocks with the fingers, you forcibly distend the sphincter as you bring the thumbs against the tuberosity of the ischium. This, at first sight, may appear a very rough and harsh mode of operating, and is so regarded by some, who, I believe, for this reason denounce it; and again, because it has been said to give rise to undue laceration of the tissues and troublesome hemorrhage. I have resorted to this means a great number of times, and have never seen any but good results follow. When we use the knife, we draw the blade through the centre of the ulcer or fissure, so as to divide the mucous membrane and some or all the underlying muscular fibre of the sphincter. Whether to divide all or only a portion of the muscle is a disputed point. That a superficial incision will suffice, in many cases, in relieving pain and curing the disease, I know from personal experience; and it does so just in the same way that a caustic may act, viz., in dividing an irritable or inflamed nerve. Should you desire to be more certain of the result of the operation, a free incision of the muscle, thus securing a longer period of rest to the parts, is best, and by many this is always made. (Dr. Erskine Mason, New York, p. 178.)

Hernia.—In a case of large congenital inguinal hernia in a boy eight years of age, I made an incision an inch and a half long, parallel to and between the pillars of the external ring, and dissected down carefully till the pillars were clearly exposed. I endeavoured to roughen their edges by scraping them with the scalpel, and then introduced two catgut sutures at a fair distance from the margins, laying the needle flat against the inner surface of the tendinous tissue to avoid wounding the peritoneum (both rings being drawn close together, owing to the long duration of

the hernia), and tied these ligatures firmly, leaving room for the spermatic cord, cut the ends off close, and then united the skin with the same material and applied the carbolised dressing. The whole operation was performed under the carbolic acid spray. No bad symptoms followed, the deep parts united firmly, the superficial granulated. The case appeared to be permanently cured for six months, when owing to some unusual exertion, the hernia suddenly re-descended. The operation having been so successful, was repeated, three sutures being introduced instead of two, the cord having left a less free channel. When the external wound was quite well, a truss with a flat india-rubber pad was applied. At the present time, a year after the second operation, and the truss not having been worn for 24 hours, no impulse can be felt, and the deep union appears firm and complete. (Mr. C. Steele, p. 180.)

Strangulated Hernia.—Mr. Adams relates a case of strangulated femoral hernia, which he succeeded in reducing by large injections of oils, after complete strangulation for more than three days. He recommends the injection of two quarts of olive-oil, three ounces of castor-oil, and three ounces of turpentine mixed together, and this may require to be repeated. The injection is to be slowly performed, and a long gum-elastic tube about nine or ten inches in length is to be used. (Mr. W. Adams, p. 182.)

Aspiration. — It becomes a very serious question indeed, whether any surgeon is warranted as a rule in performing the old operation for hernia, before having tried the simpler and safer plan of aspiration. The one, if not sufficient, does not preclude the use of the other. Even the warmest advocates of aspiration in hernia do not pretend that it is of universal applicability. Its use will not tend to the reduction of a strangulated epiplocele, but can we always be certain with what we are dealing in such circumstances? Better give the patient the benefit of the doubt, and then operate in the usual manner if there is no reduction. Neither will it suffice *per se* to reduce herniæ complicated by bands of adhesion; but its use will, by reducing the size of the gut protruded, make the ulterior cutting operation easier. In a very small hernial knuckle, such as is not unfrequently found in the femoral region, little will be achieved by aspiration. (Dr. J. P. Bramwell, p. 185.)

Distinction between Strangulated and Incarcerated Hernia. — A sharp line of distinction cannot be drawn, but tact, attention, and practice, will enable us soon to settle approximately the

symptoms which should decide us on either proceeding promptly to operation, or adopting other courses with a view to promoting the return of the hernia. I would say that, if the patient be young and healthy, the hernia recent, small, tense, and painful to the touch, with the abdomen hard, and either retracted or distended and tympanitic, prompt operation is the safest remedy. But in the aged—when the hernia is large and of long standing—when, if a truss has not been worn, the parts have had time to accommodate themselves to the abnormal state, or, when a truss being worn, a large mass suddenly protrudes; when handling gives but little pain or suffering—in such, I think, other remedial measures may have fair trial. The warm bath, if convenient, or, what I prefer, large hot fomentations, and a moderate trial of the taxis, preceded by a large dose of opium—I prefer this to either chloroform or tobacco. (Mr. J. W. Martin, p. 187.)

AFFECTIONS OF THE URINARY SYSTEM.

Advanced Prostatic Disease.—*New Operation.*—If anything can be done for the relief of patients suffering from advanced prostatic disease it is worth trying, even if some risk is incurred. I propose in these circumstances a proceeding similar to that which we employ in the trachea when death is imminent for want of air—viz., the introduction of a tube beyond the seat of obstruction — one which is to be permanently retained there as the constant channel for urine, just as the tracheotomy tube has been for many a patient the only channel during years for air to the lungs. In other words, I propose to puncture the bladder above, or rather behind the pubes. The proceeding which I have practised differs from ordinary puncture, and more resembles the high operation for stone, being rather a compound of the two. The operation, which I have now performed three times, consists in passing a large sound, hollow throughout, with a strongly marked curve; that represented at A in the figure (page 210), I have found as good as any, but it may be modified somewhat, according to the case, and closed by a bulbous-ended stylet (B). The instrument is introduced by the urethra until the end can be felt just behind the symphysis pubis. It is then confided to an assistant to retain in its place. The operator now makes an incision not more than three-quarters of an inch in length, less if the patient is not stout, enough to admit the index finger tightly (since a large opening becomes embarrassing subsequently), in the median line at the upper margin of the symphysis. The tissues are

separated by the finger, and the linea alba being next slightly divided by the point of a bistoury, the finger is passed down closely behind the symphysis, and when the end of the sound is clearly felt, a little opening is made so as to expose its point. The operator now, taking the handle of the sound in his left hand, makes the end protrude in the wound, the bulbous stylet is withdrawn, and he passes the tube c in its whole length into the hollow channel of the sound. He now withdraws this completely by the urethra, and in doing so necessarily ensures the passage of the elastic tube into the bladder. The path of safety is to make a very small opening directly above the symphysis, then to find the way close behind it to the end of the sound there, and incise only just enough to allow this to be pushed up into view. The insertion of the tube into the hollow of the sound, and the withdrawal of the latter, as already stated, brings the tube into its place. But it may be remarked that the urine may not at first flow through it, for the withdrawal of the sound may carry the tube, not only into the bladder, but, when this is empty or very contracted, even through it into the prostatic urethra. If so, the tube has only to be withdrawn a little and the urine flows. Indeed I have found that the tube is usually improved, especially in the subsequent progress of the case, by being a little shortened. It is then to be fastened securely with tapes and plaster, and to be worn a few days in bed until the parts are consolidated, and the patient can move about with safety. If the tube escapes during the first two or three days it may not be easy to replace it, but when the passage is established it may be removed and replaced easily enough. A very important injunction is to make the wound as small as possible so as to be nearly filled by the tube. A large wound is more painful, and is constantly traversed by the urine. (Sir Henry Thompson, p. 207.)

Ammoniacal Cystitis.—*Benzoic Acid.*—Cystitis is caused by ammoniacal urine. If we can saturate the carbonate of ammonia of the urine without employing substances which may form insoluble salts, such neutralisation will serve as a powerful adjuvant to the treatment ordinarily employed in diseases of the urinary organs. To all acids except one there is some objection. Benzoic acid, formerly recommended by A. Ure, is the only one which meets the contingency. This is rapidly transformed into hippuric acid, and exerts no ill effect upon the economy, persons both in health and ill being able to take from two to six grammes per diem without detriment. Hippuric acid, thus formed, increases the acidity of normal urine, and in ammoniacal urine prevents the formation of

phosphatic deposits by combining with the ammonia, which without it would have formed with the phosphate of magnesia contained in the urine an insoluble ammoniaco-magnesian phosphate. The hippurates in general, and especially the hippurate of ammonia, are very soluble. Benzoic acid is very slightly soluble in cold water, which constitutes one of the difficulties of its employment; but it may be given in suspension in mucilaginous or syrupy mixtures. A formula is—Benzoic acid 1 to 3 parts; neutral glycerine, 4 to 6 parts; and mucilaginous mixture, 150 parts. As a general rule, only one gramme (fifteen grains) per diem should be given at first, this quantity being rapidly increased to three or four grammes. To many patients as much as six grammes may be given, providing this quantity be not persisted in for too long a time, as indicated by dryness and a sense of smarting in the pharynx. The production of acidity or neutralisation of the urine does not take place at once, the extreme limits of time which have been observed being from five to nineteen days, the mean period being from seven to eight days. This effect is announced by the diminution of phosphatic deposits, pus, and blood, and by a modification in the odour of the urine, the fetidity of which is gradually lost. (MM. Gosselin and Robin, p. 80.)

Copaiba as a Diuretic.—Copaiba is a diuretic of considerable value. In a case of ascites the patient was ordered to take three capsules night and morning. Three days afterwards the urine was found to have increased from 14½ to 65 oz. in twenty-four hours. The ascites rapidly diminished until in six days no fluid could be detected. The vertical dulness of the liver was 6 inches. (Dr. E. L. Dixon, p. 311.)

Diabetes.—*Glycerine.*—Diabetic patients lose a great deal of sugar, which in a state of health would be changed into carbonic acid and water. A great deal of respiratory heat is thus lost, and the patients must therefore use adipose matter and protein compounds for breathing purposes. To save the protein matters glycerine is administered, since it has been shown by physiologists that it cannot be transformed into sugar within the economy, but is ultimately changed into carbonic acid and water. Thus respiration is supplied, and no tissues actually wasted. It is stated in the Mouv. Méd. of Jan. 23rd, 1875, that Prof. Schultzen gives in such cases from six to eight drachms of glycerine per diem. The remedy should be continued uninterruptedly for one month, the doses remaining the same, as larger ones are apt to give rise to diarrhœa. (Lancet, Feb. 20, p. 289.)

STONE IN THE BLADDER.—*Dolbeau's Operation.*—The principle of what was known as the old Marian method was "a small incision, much dilatation." This dilatation was however carried out in a faulty manner. This defect is remedied by Dolbeau's plan of operating. The neck of the bladder, even dilated to its extreme limits, will not afford room for the extraction of any but the smallest calculi. Hence the necessity of crushing previous to removing the stone, and the name of "perineal lithotrity" given to the operation. The instruments used are few: a scalpel, a screw dilator, a crushing forceps, and various-sized seizing forceps. The essential feature in the screw dilator is that the blades keep parallel in every stage of their expansion, forming together a cylindrical body, the diameter of which varies with the action of the screw. At rest, the six smooth blades or columns are in apposition, and run up to a common point. They conceal two balls capable of moving up and down along a central stem, and of separating the columns more or less without causing them to diverge. The patient being placed in the usual lithotomy position, the incision, two centimeters in length, is made with the blade upwards, and begins immediately in front of the anus, at the brown zone marking the passage of skin into mucous membrane. A deeper incision opens up the perineal fascia, through which the knife, guided by the left index-finger, is thrust into the membranous portion of the urethra. The work of dilatation now begins, and from the amount of care with which it is accomplished depends in a great measure the success of the operation. Four successive dilatations are employed by Professor Dolbeau. The first stretches the external aperture and the subcutaneous tissues. The instrument is next closed, and passed up to the groove of the staff and firmly pressed against it whilst the expanding screw is being turned—a proceeding that causes the whole of the membranous portion to slit up along the line of incision. The instrument can now be pushed one step further along the staff, which the assistant slightly depresses. As soon as the membranous region has sufficiently yielded to this third dilatation, the dilator is closed and pushed onwards into the neck of the bladder, the staff is withdrawn and the screw cautiously turned until expansion is complete. The passage thus formed is of uniform calibre, and has smooth walls. This can be felt by the finger in the dead subject. In the living Professor Dolbeau deprecates the use of digital examination. The stone is now within easy reach, and if very small will be removed by the light forceps used in making the first exploration after removal of the dilator; generally,

however, it has to be broken up by the cassepierre. This is introduced without any great difficulty, and, thanks to the broad blunt beak in which it terminates, it obtains an easy grip even of the harder and smoother concretions. Large stones cannot be clasped, but will usually yield to the repeated bites of the instrument. The fragmentation of the stone is often very great; and to extract everything, even with the help of injections, is a task requiring much patience. Before the patient is released from the lithotomy posture, a catheter is always introduced through the natural channel to obtain a crucial proof of the bladder having been cleared. (Dr. W. Ewart, p. 204.)

Stricture of the Urethra.—Gradual dilatation, such as is accomplished by the passing of bougies at regular intervals, is, in my opinion, the most satisfactory method of treating uncomplicated organic stricture, as regards both its safety and the duration of the relief which it affords. In carrying out this method, I must express my strong conviction that the employment of metal bougies is to be preferred to instruments of a softer material. In carrying out gradual dilatation, the instruments should be passed at intervals of two, three, or four days, according to the amount of irritation which follows the proceeding. Holt's, Thompson's, and other methods of immediate dilatation or rupturing the stricture may be employed in very tight strictures, but recontraction follows much sooner than when the gradual dilatation is employed. In cases of organic stricture with constantly recurring spasm or contraction, gradual dilatation has only a very temporary effect, and the operation of internal division is to be preferred. For this purpose, Dr. Gouley's instrument (of New York) is most efficient and satisfactory. Organic stricture complicated with retention of urine, unrelievable by the catheter; obliteration of the urethra; urinary infiltration, abscess, or fistulæ, is most effectually treated by the operation of external division: for it is only in this way that the complications can be got rid of. (Mr. T. Annandale, p. 201.)

Syme's Perineal Section.—When the time arrives for the operation, and everything else has been prepared, it becomes the duty of the surgeon or his assistant, to introduce the Syme's grooved staff, in which it will be remembered one part is made extremely small, equal in the curved portion to a No. 2 or 3 catheter, the shaft of the director being equal to a No. 8 or 10. As soon as the instrument is brought down to the face of the stricture, with the urethra prepared by extreme

dilatation, it is wonderful to notice how readily, in most cases, a urethra which ten days previously would not permit in any way the passage of a small catheter will now receive the narrow portion of the director, and we may slip it on through an indurated stricture into that wider portion of the canal which leads to the bladder. (Mr. E. Lund, p. 190.)

AMPUTATIONS, FRACTURES, DISLOCATIONS, AND DISEASES OF BONES AND JOINTS.

AMPUTATIONS THROUGH JOINTS.—For a long time a very great prejudice existed against amputation at joints, founded chiefly on the recognised danger which attends "wounds" of articulations. The fear was great of exposing cartilage and fibrous tissues to the air, or interfering in any way with these structures. The opinion has prevailed that proper adhesion would not take place between a surface covered with cartilage and the soft parts laid over it; that the suppuration would be rendered far more profuse by the presence of the cartilage, which it was thought must exfoliate before the stump could heal. Those among us, however, who have had much operative experience, and whose attention has been directed to the fact, must have seen many cases in which the incrusting cartilage of a bone has behaved in no such injurious way, but on the contrary, has given no trouble whatever. To constitute a good "method" of amputating the chief requirements evidently are—thoroughly to remove what is destroyed or diseased; to retain as much of the body as possible, *i.e.*, to keep as far as we can from the trunk, and so diminish the risk of the operation; to obtain sufficient covering, and that of a kind which will form a good stump (muscle to cover bone, and skin to cover muscle); to fashion our flaps so that they will readily fall into and retain their place; to provide good drainage; and to place the blood-vessels and nerves, and also the cicatrix, out of the way of pressure. (Dr. G. B. Macleod, p. 87.)

ANTISEPTIC SURGERY.—*Recent Improvements.*—It is very convenient to use high-pressure steam as the motive power, on the principle of Siegle's steam inhaler, for the purpose of providing an antiseptic atmosphere in the form of spray, during surgical operations. The water of the condensed steam dilutes the solution with which it becomes blended in forming the spray, so that it is needful to use a larger pro-

portion of the acid. In the machines hitherto constructed one part of water is consumed by ebullition for three parts of solution sucked up to mingle with it, and thus 1 to 30 is the proper proportion of the acid in order to form a 1 to 40 spray. As a dressing for excluding putrefactive fermentation from wounds, the antiseptic gauze, which contains in its fibres carbolic acid stored up in common resin, which is of course insoluble in the discharges and holds the acid with great tenacity, has continued to prove thoroughly trustworthy if properly used. Under ordinary circumstances we still use the gauze in eight layers, with a sheet of some trustworthy impermeable tissue placed beneath the outermost layer to prevent the discharge from soaking directly through the dressing. The most durable and therefore most reliable material for the purpose, consistent with the requisite lightness, is a fine cotton cloth with a thin layer of caoutchouc on one side, known in the shops as hat lining or thinnest mackintosh. The use of gauze is unfortunately restricted by the high price at which it is often sold. By the following plan, however, the wholesale price has been reduced by more than half, at the Royal Infirmary of Edinburgh. First I may remark that the chief element in the cost is the cotton cloth, the expense of the materials with which it is charged being less than a farthing per square yard of the gauze. It is therefore of great importance to obtain the muslin as cheap as possible from the manufacturer, and a little saving is effected by having it unbleached. (Lang and Cousin, 42, Ingram Street, Glasgow, supply the unprepared gauze at the wholesale price of $1\frac{1}{2}d.$ per yard.) The materials used for charging the gauze are—1 part of crystallised carbolic acid, 5 parts of common resin, and 7 parts of solid paraffin; the last ingredient being used for the purpose of preventing undue adhesiveness. Paraffin has this advantage compared with any other substance of similar consistence with which I am acquainted, that it does not blend at all with carbolic acid in the cold, and therefore simply dilutes the mixture of acid and resin, without interfering in the least with the tenacity with which the resin holds the acid. For details of the mode of charging the gauze, the reader had better refer to the original article. (Prof. Lister, p. 137.)

There are some circumstances in which oily solutions of carbolic acid are valuable. For lubricating instruments introduced into the bladder, such as catheters, bougies, sounds, or lithotrites, I have for some time past used a solution of one part of carbolic acid in twenty parts of olive oil —a proportion which, while unirritating to the urethra, is

trustworthy as an antiseptic; and there can be no doubt that the avoidance of putrefactive fermentation within the bladder is in many cases a matter of vital importance. In using a catheter, the interior of which cannot be kept clean, but must have more or less of foreign material encrusted upon it, some of which might by chance enter the bladder from the regurgitation, the instrument should either be kept for several minutes with the carbolic oil within it before it is passed, or, what is more efficient and saves time, it may be washed out with the 1 to 20 watery solution before being smeared with the oil. The treatment of cases of disease of the bones of the tarsus by the antiseptic plan presents some difficulties, arising from the fact that the sinuses contain putrescent matter. The best plan is to wash the cut surfaces with a solution of chloride of zinc—forty grains to the ounce. Chloride of zinc has this remarkable peculiarity among all antiseptics that I have tried, that a single application of it to a recent wound in a solution of the strength above mentioned, though it produces no visible slough, yet prevents the occurrence of putrefaction in the cut surface for days together, in spite of the access of septic material. (Prof. Lister, p. 143.)

Chronic Bursitis Patellæ.—In this disease, with fluid effused within the sac, the usefulness of antiseptic treatment, combined with the insertion of a drainage-tube, is well seen. The skin being washed with 1 to 20 carbolic lotion, a puncture is made under the spray with a tenotomy knife, sufficient for the introduction of a drainage-tube scarcely larger than a crowquill, care being taken that it penetrates fairly into the cavity of the sac, which often lies at a considerable depth in consequence of thickening of the membrane and of surrounding textures. The narrow drainage-tube may be readily inserted by means of a simple modification of the dressing forceps introduced by myself several years ago, but hitherto unpublished. The blades, which are straight, are ground down to the size of a probe at their extremities, so that they can be passed into a very small orifice. This instrument, which goes by the name of sinus-forceps among the Edinburgh instrument-makers, will be found very useful for extracting small exfoliations and for various other purposes. The clear fluid contents being all pressed out of the sac, a gauze dressing is applied, and retained in position with a figure-of-8 bandage. Owing to the subsidence of thickening it may be necessary next day to shorten the drainage-tube. The tube being shortened to the requisite degree, the dressing now applied might be left untouched for a week or

far as regards the purpose of ensuring absence of putrefaction; but it will be well to expose the part again in two or three days in order to ascertain whether or not the drainage-tube may be dispensed with; the rule being that it should be continued so long as the serous stain on the gauze is more than the puncture, as distinguished from the interior of the sac, would account for. This is probably the case within a week of the opening of the bursa; and then, the drainage-tube being discontinued, and a small piece of protective being interposed between the puncture and the gauze so as to permit cicatrisation, the little sore will be found completely healed in the course of another day or two. At the same time the sac will be free from any fluid accumulation, and the surrounding thickening either quite gone or quickly disappearing.—(Prof. Lister, p. 130.)

Diseased Joints.—Disorganised joints are more amenable to direct local surgical treatment than is generally supposed, and free incisions into joints and the removal of necrosed bone from joints are both excellent and successful operations. Both these measures are far less severe than resection in the bulk of cases, and far less serious than amputation; and in a number of instances they are also most successful. A free cut into a suppurating or disorganised joint, whether associated or not with bone disease, is rarely followed by any other than a good result. When the suppurating process is due to synovial disease, a recovery without further surgical interference may be looked for. When due to local necrosis the incision helps nature towards the recovery of the cases by expediting the process of exfoliation, and the subsequent removal of the bone by either natural processes or some surgical proceeding. And in still more severe cases the incision gives relief, and in no way tends towards inducing any increase in the mischief. (Mr. T. Bryant, p. 106.)

Drainage Tubes in the Treatment of Abscess.—In the case of abscess beside the rectum a bit of lint soaked with carbolic oil is used for a drain, simply because in this situation it is not easy to keep in position a caoutchouc drainage-tube, which, under ordinary circumstances, is greatly to be preferred, since it does not at all obstruct the flow of discharge, and may be carried to any depth that is desired, and can be removed and reintroduced without difficulty. Hence a drainage-tube of comparatively small size introduced through a mere puncture in the skin, or through a small

interval between stitches, is more efficient than a free incision or a widely gaping wound without the use of a tube. It is impossible to exaggerate the importance of drainage-tubes. In abscesses they must be employed till the cavity is completely closed; and in wounds not only are they invaluable during the first twenty-four hours, when the irritation caused by the action of the antiseptic on the tissues during an operation renders the flow of bloody serum more free than it would be without antiseptic management; but when the wound is of any considerable depth they should be used so long as even trifling serous oozing continues. (Prof. Lister, p. 147.)

Fractures.—*Permanent extension*, as applied to fractures, and *extension* also after replacement, should be discarded from the vocabulary of the surgeon, and *retention* substituted for it; and this is of easy accomplishment by properly constructed forms of apparatus. For fractures of the thigh a Liston's long splint, or a piece of deal of length sufficient to reach from about three inches above the spine of the ilium to a little beyond the sole of the foot, and of about three inches wide, will do. Make longitudinal slits into the holes in the upper end of Liston's splint and do the same in the other. Make a pad of the same width, and a little exceeding in length the splint; three or four folds of linen will do. Sew these together, and at the same time, on one side, the whole of its length, pieces of ordinary bandage sufficiently long to reach round the body and limb, and on the other a piece of linen about three times the width of the splint. This is for the purpose of securing the stuffing afterwards described. Let the patient lie on his back, as if erect, the body not inclining to one side more than the other. Place the pad against the limb, and fasten it by means of the bandage, so that it lies closely throughout its whole length. Against the pad lay the splint, and where it touches the limb secure it by means of extra pieces of bandage. Now adjust the perineal band. This must be done with care, as the length when once fixed must not be altered. Fill in now completely, evenly, yet firmly, the interspaces between the body, limb, and splint, with any material at hand which will not readily shift its position, such as rag, paper, tow, hay, straw, &c. Having done this, secure the ends and sides to the splint by means of drawing-pins or tacks. Remove the splint from the side, and secure the pad immovably to it by tying it through and through. Adjust the fracture, and apply the splint in the ordinary way by bandage, which for security should be tacked to the sides of the splint. By this

means the natural form and length of the limb will be preserved; muscular contraction restored in all its energy, not destroyed; and nature thus assisted, not impeded, by art, is enabled to perform her work in the most speedy and perfect manner possible. More than this art cannot achieve.

In fractures of the leg, whether simple, compound, or comminuted, a rough-and-ready yet effective apparatus can be contrived as follows:—Take a piece of board half an inch thick and somewhat wider than the limb; scribe the outline of the sound limb upon it, and, by any ready means at hand, pierce holes at equal distances apart along each side parallel to the line, allowing a little space for a pad (if nothing better is at hand, a bit of red-hot iron will do to make the holes); reverse the board and drive pegs of sufficient height into them, and on the underside fasten at each end a semicircular piece of wood, thus making it a rocking cradle, in order that the limb may be enabled on lateral movement, to carry the cradle or splint with it. Here again the natural form is restored. In cases of compound fracture, the pegs on either side can be removed and any portion of the limb exposed for dressing. (Mr. W. H. B. Winchester, p. 92.)

Fracture of the Femur.—Counter-extension is best obtained by elevating the bed at the foot a height of four or six inches. This tilting is borne without much inconvenience by the patient, and is sufficient for all purposes. Extension is to be made by means of a weight running over a pulley at the foot of the bed, and attached to the leg by means of adhesive plaster. The great secret of applying the extending plaster effectively, so as to avoid slipping, is to cut the plaster of sufficient length to extend almost to the knee, and broad enough to encircle the leg at its upper part about the calf, then gradually narrowing to a breadth of about two inches opposite the ankle. A strip of plaster four feet eight in length and four inches in breadth at the end is usually enough for an adult, but the limb should be measured if a good fit is wanted. The plaster must be smoothly applied along the outer and inner sides of the leg, slitting it at the top if necessary to make it lie neatly. It will be found that a loop of two or three inches long extends beyond the sole of the foot. In this loop must be placed a piece of wood of sufficient length to prevent the malleoli being pressed on. A convenient size for the foot-piece for an adult is about three inches and three-quarters long, by two inches broad; in its centre is a hole to receive the cord to which the weight is applied. A bandage is then applied from the toes to the knee, passing the bandage beneath the plaster till the ankle is

reached, from whence it is carried over the plaster. The weight must not be attached for at least six hours afterwards, in order to allow the plaster to settle and penetrate into the skin. Extension strips applied in this way will remain without any material amount of slipping for a period of six weeks. The thigh should be fitted with four carefully-padded splints, one on each aspect of the limb, extending the whole length of the thigh as far down as the condyles, except the posterior splint, which should extend two inches below the knee, to aid in steadying the joint. There ought to be an interval of half an inch between the sides of these splints. The extending weight having been applied, these splints are to be secured to the limb by two straps with buckles fastening for convenience, on the front of the thigh. The extending weight will vary with the requirements of the case; a rough rule is one pound for each year of age up to twenty. It only now remains to apply the long inner and outer splints. There is no band or other pressure on the perineum, but the extension is made by a weight running over a pulley at the foot of the bed; whilst for counter extension there is the whole weight of the patient's body with its inclination towards the head of the bed, given by the bed being raised four or six inches at its lower end. (Dr. T. Browne, p. 97.)

Fracture of the Patella.—Place a piece of good adhesive plaster on the front of the leg, its upper edge being cut in a crescentic shape to fit round the lower edge of the fractured patella, and to each of the corners of the crescent attach a small loop. Do the same with the lower part of the thigh, making the crescent to fit the upper edge of the patella when the fractured parts are approximated, and attach the loops as before. Carefully bandage both leg and thigh nearly up to the free edge of the plaster. Swing the leg in a "Neville's Splint" (an ordinary cradle splint will do). The bandage should induce the splint. A piece of cord is to be attached at each side to the loops connected with the plaster below the patella, then passed through the loops of the cornua of the upper plaster, and thence carried over two pulleys clear of the bottom of the bed. The two cords are to be united below this and a weight attached (*vide* woodcut, p. 129.) It will be seen that the weight makes traction upon both plasters, drawing them together and approximating the fractured pieces of bone. (Mr. G. W. Callender, p. 128.)

Expectant Method.—Samborn's method of treatment is as follows:—A pad being placed above and below the broken

fragments, a long strip of plaster is applied on the anterior surface of the thigh and leg, extending from the hip to the ankle; a loop is left over the knee-joint, and into this a stick is inserted; by twisting the loop by means of the stick, the pads are brought together and drag the fragments of the patella with them. By this means they can be closely approximated, and this without any objectionable tilting. The results obtained by this plan of treatment are excellent. The plan of treatment adopted by Mr. Pridgin Teale does away with the necessity for any special apparatus, and combines the two great desiderata, simplicity and efficiency, and I think may with propriety be designated the "Expectant Treatment." In a case which occurred in 1865, the leg was placed on a pillow and slightly bent between sandbags, and evaporating lotion was applied. By January 12th the distance between the fragments had diminished to one quarter of an inch; by February 4th they were almost touching; on February 11th the patient was allowed to get up with a starch bandage on; and on February 20th he was made an out-patient, the fracture being united without any perceptible interval, apparently by a band of strong fibrous tissue. Three reasons can be assigned for the gradual approximation of the broken fragments:—(1) At the time of the injury the quadriceps extensor is thrown into a state of tonic contraction; after a few days this contraction relaxes, and the muscle gradually regains its normal length, thus removing all traction from the broken bone. (2) The effusion which always occurs at the time of the accident is slowly absorbed, and by its removal allows the fragments to fall together; and (3) the fibrous band which is formed between the opposing surfaces has, like all other cicatricial tissue, a tendency to contract, and thus to complete the approximation. (Mr. A. F. M'Gill, p. 125.)

Use of Malgaigne's Hooks without Penetrating the Skin.—Malgaigne's hooks have never been much used for fracture of the patella, although perfect as a mechanical contrivance for maintaining the fragments in accurate apposition. By protecting the skin well with several layers of moleskin plaster —the fragments of patella being held in close apposition at the same time—the hooks may be applied with perfect success, yet without their points penetrating the skin. (Prof. Spence, p. 123.)

Ununited Fracture.—Mr. Annandale, of Edinburgh, relates a case of ununited fracture of bones of the forearm. A small portion of bone was sawn off the ends of the ulna and a larger

portion off the ends of the radius at the points of fracture. This was necessary, because a portion of ulna at the point of fracture was last atrophied. The ends of both bones were then drilled and secured with strong silver wire. The edges of the wounds being brought together with a few carbolised silk sutures; antiseptic muslin was applied in the usual way and the arm adjusted on a splint. A very successful result followed. It is suggested that the same plan of treatment might prove valuable in cases of recent compound fracture of the bones of the forearm; in order to prevent their inward displacement, with union of radius and ulna to one another. The instrument used for drilling the bone is a joiner's common small pricker. (Mr. T. Annandale, p. 95.)

Hemorrhage from deep-punctured Wounds.—No surgeon will hesitate about the propriety of tying both ends of a divided artery when it can be readily got at, and when the anatomical relations to it can be defined; but when a knife has been thrust deep into a limb in the proximity of large vessels, and when blood wells up rapidly, showing that some considerable-sized artery has been cut, I would warn the surgeon to pause before he dilates the wound. The line of treatment most likely to ensure success is to bandage the limb carefully from below upwards, not too tightly. Suitable compresses should then be applied to control any bleeding from the lower end of the vessel. Supposing it to be a lower limb, direct pressure must be now brought to bear on the femoral artery, just as it passes off the pubis, so that the current is nearly altogether obstructed. The limb must now be supported on pillows and elevated. We thus depend for the supply of blood to the limb from the numerous anastomoses which surround the hip on all sides. The same mode of practice may be strongly recommended in cases of secondary hemorrhage after amputation. (Dr. R. G. Butcher, p. 151.)

Resection of the Os Calcis.—The incision which I make is commenced at the back of the foot, just on the internal side of the tendo Achillis, on a line with the middle of that part of the os calcis between which and the tendon the bursa is placed, so that the first portion of the incision being carried boldly down to the bone, this bursa is opened and the tendon set free. The incision is then carried round to the external side of the heel, and so directed that it shall pass along a line extending one-third down from the tip of the external malleolus to the under-surface of the foot, with a slight inferior convexity, then carried on to the spot where we know the os calcis and the cuboid are in contact. The incision

being carried down as here indicated, very little more division of structure by a sharp instrument is needful. I detach the soft structures first from the underpart and back of the os calcis and, if possible, I even carry the separation as far as its internal surface, so that after a little perseverance and time I am enabled to get the tuberosity of the os calcis to project through the wound by slipping the lower flap well under the bone. The next step in the operation consists in the detachment of the os calcis from the under part of the astragalus, and here it is necessary to proceed upon the upper part of the wound, where, it will be noticed from its position, we have only to work over one-third of the distance, and in doing this I take great care to detach the tendons of the peroneal muscles from the side of the bone without injury, which can be done if a sharp scalpel be not used. The os calcis can be entirely extracted; and provided that in all the incisions which are made during the operation, the instrument (whatever it may be which we employ) is kept close to the bone, no structures of any great importance can be divided. As soon as the os calcis has been thus got out it becomes our duty to ascertain, either by the finger, or by ocular examination, what may be the condition of the under surface of the astragalus and of the posterior surface of the cuboid. Here, if the cartilages are roughened or destroyed, or if the bone should appear to be softened (as occurred in one of the three cases I have mentioned) it will be right to gouge away, or by some other method remove, all the softened bone we can get hold of. (Mr. E. Lund, p. 102.)

Sutures.—*Horsehair.*—A well-selected white hair out of a horse's tail is in many respects better than any suture hitherto devised. That from the tail of a white or grey horse is the best. He cannot tell why it should be so, but he finds the white better than the black hair. The matter, he says, may appear a trifle, but it is nevertheless an important trifle, for if the alleged inconvenience and even danger from suppuration from the hemp and silk ligature, or the disadvantages of the wire, can be avoided, the subject is sufficiently interesting to be worthy of consideration. (Dr. Fayrer, Practitioner, Jan., p. 59.)

Talipes Equinus.—*New form of "Boot" for.*—Mr. Annandale describes a new form of boot for the treatment of this disease. It may be used either with or without division of the tendo Achillis. It consists of a foot-piece and leg support connected together by a moveable joint on each side, so as to allow of flexion and extension at the ankle-joint. At the

back and immediately behind the tendo Achillis is a screw which is turned by means of a key. When the screw is turned in one direction it elevates the heel and the appliance can in this way be adapted accurately to the deformed foot. By turning the screw in the opposite direction the heel is depressed, and the relief of the distortion gradually and efficiently accomplished by acting upon the contracted tendo Achillis and other textures. (Mr. T. Annandale, p. 135.)

AFFECTIONS OF THE SKIN, ETC.

ALOPŒCIA.—*Local Stimulants.*—A man, 54 years of age, had in the course of a few weeks become perfectly bald, the scalp being white and shiny. Nearly the whole of the body was more or less similarly affected. The probable cause had been a sudden and severe nervous shock. He had been under treatment for some months without benefit. Locally to the scalp I painted on some blistering fluid, repeating the application once a fortnight, and ordered the following lotion: carbonate of ammonia one drachm, tincture of capsicum one drachm, rectified spirit one ounce, glycerine one ounce, and rose-water to eight ounces, to be applied freely over the body night and morning. For two months I could distinguish no appreciable improvement in his condition; but after that period, new hair, very silky and quite white, began slowly to grow, and became thicker and stronger until the body and head assumed all the appearance of health, being well covered with hair over the different regions, although the colour of that hair, originally dark brown, was now permanently quite white. (Mr. E. C. R. Roose, p. 248.)

HERPES.—*Zinc Phosphide.*—The power possessed by phosphorus over certain forms of neuralgia is well known. In those cases in which the nerve pain has a special relation to debility, this drug effects a cure with a certainty and rapidity which approximate its action to that of a specific remedy. This is most true when the debility is attended by marked anæmia, whether that be the result of hemorrhage, or the less direct result of other causes. It is over the nerve trunks, and more particularly when they are superficial, that phosphorus exerts special powers. This is exemplified in cases of acute neuralgia, occurring in persons who are otherwise in good health. A person employed in exposed situations sustains a continued application of cold and damp air to the side of the face, and is shortly attacked by neuralgic pain in the trifacial nerve. Such a case as this will yield with rapidity and certainty to a few stimulant doses of phosphorus. The cause of the attack is local—the attack confines itself to a definite

situation and the remedy removes the condition in too short a time to allow of any modification of the general state of the patient. Phosphorus has been found by Drs. Broadbent and Eames to be possessed of powers over chronic skin diseases, which are superior to those of arsenic in the rapidity with which they are evinced. Psoriasis, eczema, acne indurata, lepra, lupus, and scrofulo-derma have all of them, and that in more than one or two instances only, yielded to this drug with marvellous rapidity, notwithstanding that in some cases the affection was of old standing. No more elegant or effective means of exhibiting phosphorus exists than a concentrated form of the solution enclosed in little gelatine envelopes forming what are known as "*perles*." These it need scarcely be said, are quite tasteless; and if taken immediately atfer meals, cause little or no phosphoric eructation. (These capsules are prepared by Messrs. Young and Postans, London, containing various doses of the element.) In the eruptive fevers, it is the stimulant effect of the drug which it is desired to produce, and it must be attempted in the same manner—by exhibiting full doses from the beginning of treatment. As a rule, for this purpese I should be inclined to prefer phosphorus in an alcoholic or etherial solution, given in a dose equal to one-twelfth of a grain, and repeated every four hours. But where the object in view is to give tone to the cutaneous vessels, or to improve the general nutrition of the body, a much smaller dose of the element should be employed, and its administration must be continued for long periods. In these cases, if the patient can be persuaded to swallow a large dose of cod liver oil, he may be allowed to take the thirtieth part of a grain of phosphorus, dissolved in from two to four drachms of it, thrice daily. If, however, this amount of the solvent be objected to, or be deemed unnecessary, the "perles" may be employed. These can be obtained containing the dose named in about four and a half minims of oil; but if these preparations be employed, I prefer to administer the same dose in a larger number of capsules (containing a more dilute solution), since, by this means, much unpleasant eructation may be avoided, to which the more concentrated solution does give rise, notwithstanding every precaution. (Dr. J. A. Thompson, p. 239.)

Psoriasis Palmaris.—In a case of this disease which was successfully treated, six minims of Fowler's solution of arsenic and half a drachm of liquor potassæ were given three times a day, and an ointment composed of seven parts zinc and one mercurial ointment was rubbed into the parts. In three weeks the physiological effects of arsenic were

beginning to show themselves, the infiltration of the skin much reduced. The medicine was diminished to one half, and a weak preparation of oil of cade rubbed into the part affected. In five weeks a slight pinkiness of the palm and an imperfect line of desquamation along the ulnar margin of the hand were the only evidences of the disease left. He considered himself cured. This case yielded much more readily than usual to treatment, owing probably to the fact that the patient was in sufficiently easy circumstances to keep his hand at rest till the cure had commenced. It is far otherwise with workmen who cannot forego the use of their hand. Like eczema in other parts of the body it is much influenced by external irritation. (Mr. E. A. Browne, p. 244.)

Scabies.—The best plan of proceeding is, in my opinion, as follows. Having once ascertained that scabies exists, order one thorough application at night of mild sulphur ointment to the whole of the body, except the head, and direct the patient to sleep in the drawers, jersey, and socks that he has used the day before; this will secure the death of any stray acari about the body or in his underclothes; in the morning, he should use a warm-bath. The after-treatment should consist of the local inunction of the ointment, into those parts only which are especially affected, for two or three nights. In all mild cases, the cure by this plan is quite certain, and is attended with very little inconvenience. The objections to sulphur-ointment are its irritating qualities and and its smell. The first is avoided by using an ointment made with half a drachm to two scruples of the precipitated sulphur to one ounce of lard. The precipitated is in finer powder, and less gritty than the sublimed sulphur, and more efficacious. A great part of the inconvenience arising from the smell of the sulphur may be avoided by using it only during the night. A drop or two of sandal-wood oil will quite disguise the smell. In cases of long standing, it is necessary to have the clothes baked; but a temperature of 190 deg. to 200 deg. Fahr. is quite sufficient, and the bed may be easily fumigated by using a little sulphur sprinkled on the cinders (not too hot) of a warming-pan. It often happens that the irritation of skin remains after the scabies is cured, and thus induces people to go on with the sulphur treatment too long. Instead of doing so, a mild stavesacre ointment should be used, made with the oil of stavesacre and lard; this relieves the itching, and at the same time will kill any stray acari that may have escaped death from the sulphur. (Dr. R. Liveing, p. 246.)

SMALL-POX.—*Prevention of Pitting.*—The application of honey two or three times a day by the aid of a camel's hair pencil is very useful to prevent the pitting of small-pox, presenting most of the qualities desired, viz., exclusion of the air, preservation of the parts permanently moist, and relief of the local irritation. (Dr. J. Ward, British Medical Journal, Dec. 19, p. 773.)

VENEREAL AFFECTIONS.

GLEET.—If the gleet be due to inflamed patches, they may generally be discovered without introducing the endoscope, which is always more or less painful to the patient and troublesome to the surgeon. Put the patient on his back, and introduce a bullet or olivary bougie or sound with slender graduated stem, of a size that will just pass the meatus without pain, and push it slowly along the urethra. As it reaches an inflamed spot there will be a slight resistance, and the patient will feel a smarting pain while the bullet passes over the patch, but when this is left behind the resistance and pain both cease. By reading the number of inches which have been introduced the situation of the inflamed spot can be at once ascertained. This tender spot can be treated best by injection into the urethra at the spot two or three minims of a solution of nitrate of silver (10 to 20 grains to the ounce). Usually, and when the injection answers best, the discharge increases for two or three days, and then diminishes—if it does not stop altogether—to less than it had been before the treatment was begun. A weak astringent injection should then be used in the ordinary manner for three or four days, when the caustic solution may be applied again as before. At the end of ten days the discharge is often reduced to a few shreds in the urine, and may be finally disposed of by several methods. (Mr. Berkeley Hill, p. 252.)

SYPHILIS.—When the period of primary syphilis has long passed away, and when mercury has been given for a few weeks, it is much more difficult to decide upon the course to be pursued. We have, then, two remedies between which to choose, mercury and iodide of potassium. Of these, iodide of potassium is the more rapid in its influence upon the symptoms actually present, but it probably possesses little or no power to modify the systemic malady. Nothing in clinical history is more remarkable than the rapid amelioration of the symptoms of late forms of syphilis under the use of the

iodide; nothing is more certain, generally speaking, than their recurrence in the same or in some modified form. Mercury, on the other hand, will be slower in producing its first action, but more effectual as against the syphilitic taint; although it is not proven that syphilis of long standing can be cured by mercury, at least with anything like the same certainty as the earlier stages of the disease. It is in the eye, however, that the immediately curative effects of mercury are most remarkable; and it is from its visible action upon iritic effusions that many inferences have been drawn with regard to its supposed kindred action in parts of the body that are concealed from view—as, for instance, in the pleura. It may, perhaps, be said that the best rule of practice is to inquire whether the local changes in actual progress are such as to inflict irreparable injury unless they are speedily arrested. If they are, iodide of potassium should be given in the first instance, and should be continued until a distinct impression is made upon the case; when it may be laid aside, and mercury given instead of it, with the hope of anticipating subsequent phases of mischief. If the changes in progress are not of this pressing character, it may often be best to give mercury from the first. In order to obtain a mercurial influence quickly, I use either blue pill, or inunction with blue ointment, or both together; and, for prolonged administration, the perchloride. Inunction is often useful for adults, but its especial value is in the case of young infants suffering from a combination of purulent ophthalmia and inherited syphilis. For them, the plan I prefer is to smear every day a little fresh ointment on a strip of flannel, about an inch and a half wide, which is buttoned round the abdomen, next the skin, and worn constantly. Mr. Hutchinson is accustomed to have the ointment rubbed into the soles of the feet, the only part of an infant's skin on which it never produces irritation. There should be no such thing as a sore mouth resulting from treatment. The slightest line upon the gums indicates a point beyond which the medicine should not be pushed; and the highest art of administering mercury is to keep the patient, as it were, on the brink of this line, without permitting transgression of it. (Mr. J. Brudenell Carter, p. 249.)

AFFECTIONS OF THE EYE AND EAR.

A Pea in the Ear.—How is a pea to be removed from the external auditory meatus when it is sufficiently large to preclude the passage of an instrument behind it? The follow-

ing observation on this point is extremely interesting. The case occurred twelve years ago, and the unfortunate patient was a student at Glasgow, where at the time I was demonstrator. I had no instrument beside me but a straight needle for microscopic purposes. I touched the upper margin of the pea with this, endeavouring to introduce the needle behind the pea, when the pea rolled somewhat and receded. It then occurred to me to place the point of the needle beneath the pea, and, to my great surprise, I had scarcely begun to insinuate the point of the needle when the pea flew out with great violence. Anyone may repeat the experiment, as I have done, with a pea, a tube, and a needle, and may easily arrive at the explanation of what happened in the case which I have mentioned. If the needle be placed above the pea, it presses on the uppermost part of the sphere. By a movement of combined pressure and withdrawal the pea may then be made to roll outwards for a little distance; but in this movement needle and pea move together, so that the point of the needle, continuing to press on the portion originally uppermost but now rolled outwards, ceases immediately to act in a purely downward direction, and jerks the pea back towards the membrana as soon as the increasing pressure inwards exceeds the resistance of friction against the floor of the tube. But if the point of the needle be placed below the pea, it raises it up; and if it has been insinuated in the smallest degree beyond the lowest part of the sphere, and be on a higher level than the handle, the pea tends to roll out over it. It is not, however, essential that the point of the needle be on a higher level than the handle, provided only that the needle be properly insinuated in; for as soon as the handle is depressed so far that the point is at all inclined towards the roof of the tube, the pea is placed between two inclined planes, from between which it is expelled with force. (Dr. J. Cleland, p. 237.)

Balsam Copaibæ in Diseases of the Eye.—A soldier in India who had had repeated attacks of syphilis, had inflammation of the right eye, and the whole of the anterior chamber was filled with pus, and sight seemed irretrievably lost. Two drachms of balsam copaibæ were ordered three times a day, in mucilage. Two days after the pain he had been suffering from subsided; and the pus could be seen to be gradually disappearing. In twenty days the eye was quite well. I have been in the habit of giving it in all cases of iritis and sclerotitis for some years in India, and found it far preferable to turpentine, as it does not produce strangury, which the latter drug is very apt to do in that

hot climate. (Mr. A. R. Hall, Practitioner, April, 1875, p. 241.)

Conical Cornea.—*Operation.*—In a case of extremely conical cornea the following operation was performed on the left eye under chloroform. Two very fine curved needles threaded with very fine silk were inserted through the most prominent part of the cone, but not drawn through. In front of these needles, a small elliptical piece of cornea was removed by a long fine Von Graefe's knife and forceps. The needles were then drawn through, and the edges of the wound of the cornea thus made were brought together as accurately as possible. The lids were securely closed, and gentle pressure kept up outside; the patient was kept in bed. The fourth day after the operation the stitches were removed under chloroform. The corneal wound was perfectly healed, and the anterior chamber entirely refilled. The risks of this operation are much lessened by the use of stitches. The opacity of the line of cicatrix disappears almost entirely. (Dr. J. A. Nunneley, p. 229.)

Granular Disease of the Conjunctiva.—For general purposes there is nothing equal to a solution of nitrate of silver of 10 grains to the ounce of water, in which strength it is chiefly or wholly astringent. This solution applied daily with a moderately large camel's hair brush (the common penny brushes) cuts short most inflammatory attacks with great certainty and very much reduces the roughness and redness of the lids in the chronic granular condition, unless this be of very old standing. In a great many cases nothing else is required. After using it for several weeks on a number of children it will be found, however, that some of them do not improve either as to discharge or the state of the lids. With these either a solution of 20 grains to the ounce may be used, or the mitigated solid nitrate. If the want of effect has reference chiefly to discharge I prefer the 20-grain solution. When, however, the case is one of old thick granular lids the mitigated caustic often has more and better effect, especially as its action can be regulated with considerable nicety. The solutions of the above strength should not be washed off from the conjunctiva unless in a very few irritable cases, and such will generally not be fit cases for treatment by silver at all The solid diluted nitrate of silver should at first be washed off after 5—10 seconds with a solution of salt (5 grains to the ounce), or of chloride of zinc (2 grains to the ounce), either with a syringe or a large soft brush; but it will be found after a few weeks that in many cases the application thus made has little effect, and it will be necessary

either to wait from 15 to 30 seconds or more after applying the caustic before washing it away, or to omit washing it off altogether. The last procedure is perfectly safe in a great many cases from the beginning; but as, if used in this way to all the cases, there is risk of producing increased irritation and corneal ulceration in a certain proportion, the more cautious plan is safer. The difference between the effect of washing off the caustic and not doing so may often be advantageously studied by using one method to the right eye and the other to the left of the same patient, supposing that the disease was at first symmetrical in degree. The difference in the amount of improvement is sometimes very markedly in favour of not washing off the caustic, while in others (the more irritable ones) these conditions are reversed. The mitigated caustic should at first never be used oftener than three times a week, though some old cases will be found in which its daily application is necessary. The 10-grain solution must be used daily or three times a week, according to the effect it is found to produce. In applying these solutions I think it is much the best to invert both upper and lower lids and allow a large drop to flow over them, accompanying this with one or two gentle movements of the brush so as to distribute it equally; it is of importance to carry the brush high up above the upper edge of the tarsus in the upper lid, or this part, which is generally the seat of considerable structural change, will often escape contact with the solution. The same must be done in most cases with the solid caustic, though in this case more care is requisite in order not to touch the cornea; this accident (which has happened to me two, or perhaps three times) can be avoided partly by keeping the point of the caustic forwards instead of backwards and thus slightly lifting the upper lid away from the globe, and partly by pressing the inverted lower lid backwards and upwards, so as to intervene for a short distance between the globe and the upper lid. Solutions of more than twenty grains to the ounce are unsafe unless washed off. (Mr. E. Nettleship, p. 231.)

Iridectomy.—In the performance of an iridectomy for artificial pupil there is a golden rule for the surgeon to bear in mind—The new pupil is to be as small as he can make it: if it be too large, there is disfigurement, and the vision is rendered indistinct by circles of dispersion and by other obvious optical defects; and if it should be large enough to extend to the ciliary attachment of the iris, the power of accommodation may be diminished. It is not so easy as it would appear to be, to enlarge the natural pupil by merely excising

one of its borders; for when the iris has been gripped with the forceps it is very difficult to remove only just enough, and to do this it is necessary that the wound of the cornea should be almost over the situation of the new pupil. And if the healing of the wound should be followed by any haziness, as will be the case sometimes, then most of the benefit from the operation will be thrown away. In order to avoid this difficulty, the wound is made at the scleral junction, the iris is too freely excised, and the operation is done as if it were required for antiphlogistic purposes, and not for optical considerations. If there is one thing more certainly proved than another in the records of operative surgery, it is the power which an iridectomy, when properly performed, exercises over the progress of an attack of glaucoma. It must be stated, however, that judging from the number of cases of glaucoma absolutum which wander from one hospital to another in the vain hope of receiving benefit, either this fact is not sufficiently well known or the disease is very often not recognised. It cannot be too strongly asserted, that if performed early enough, the operation will restore sight; but if it be too late to hope for this, it should yet be done, for it will as certainly relieve the pain and other symptoms. This is not the place for any discussion on the theories which have been broached to explain its action, but it may be said here, that to be successful, the operation must be complete, and generally speaking extensive. It will not be sufficient to enlarge the pupil, or to remove merely a small portion of the iris; it is absolutely essential to remove a section of the entire membrane, and to take especial care that the ciliary attachment is completely severed. It can never be too early to operate in such cases, but it may be too late; for when blindness is complete, and when secondary cataract has developed, and the whole eye is disorganised, should pain recur, it would be dangerous to trust to iridectomy. It is very likely to be followed by intra-ocular hemorrhage, and by increase of pain; the wound will not close, and the eye has to be removed. An eye which is absolutely blind from glaucoma, if it becomes painful, should be removed; such eyes may cause sympathetic ophthalmia, or may become the seat of malignant growths. (Mr. B. J. Vernon, p. 223.)

Lachrymal Fistula.—In cases of lachrymal fistula the style is often objectionable, and even difficult to fit. Mr. Bowman divides the canaliculus in his particular way, and often succeeds. Dr. Nunneley thinks that the whole treatment may be simplified by using Mr. R. Taylor's style. This style is a straight piece of silver to fit the nasal duct, having

at right angles to it, at the upper end, a small arm about three-eighths of an inch in length; it is introduced along the slit-up lower canaliculus, through the lachrymal sac into the duct. The little horizontal arm lies in the channel of the canaliculus, which it keeps open, and prevents the style from slipping out of sight, allowing ready removal when necessary. I have used it constantly, and with great advantage. The canaliculus is slit up in the usual way, and I then either dilate for a short time with the ordinary probe, and then put in the style, or more generally, where the case is a straightforward one, introduce the latter at once. Different sizes are required. The style requires to be taken out and cleaned occasionally, and if there be any irritation set up by it, which is not common, the removal of it for a day or two is generally sufficient to allow it to be worn with ease. (Dr. J. A. Nunneley, p. 234.)

MIDWIFERY, ETC.

Cancer of the Uterus.—*Liq. Ferri Perchloridi.*—About two years ago I had occasion to dilate the uterus in a very obstinate case of menorrhagia, proceeding from large vascular granulations in the cavity of the enlarged organ. The strongest Pharmacopœial solution of the perchloride of iron (being, in fact, iron dissolved in pure acid) was injected into the open uterine cavity, and a piece of sponge soaked in the solution left there for twenty-four hours. This treatment was perfectly successful; and I viewed with surprise the efficient way in which the soft and vascular growths were destroyed, whilst the normal structures of the uterus and vagina were but little inconvenienced, and certainly not in the least eroded. Since that time I have been accustomed to use this solution in many cases of cancer of the uterus. I have always used the strongest Pharmacopœial solution undiluted, as I have only used it to secure a caustic action. At first I applied it on pieces of sponge or lint, but finally found cotton-wool to answer best, as it sucks up any quantity that may be required, parts with it readily, and can be moulded into any form so as to fill a cavity, or cover over and adhere to any growth. (Dr. C. J. Gibb, p. 278.)

Forceps.—Dr. Johnston, the master of the Dublin Rotunda Lying-in Hospital, uses the long double-curved forceps in a very large proportion of cases before the os is dilated. He says, in no one instance was the forceps applied and the

child not delivered. As a proof of the advantage of the double-curve forceps, he would mention that within the last month a woman from Denbigh, North Wales, came under his care, having in a former confinement been delivered by means of perforation. He used the double-curve forceps, and after a considerable amount of dragging he delivered her. It would be difficult to conceive a child more twisted than hers was—so much so that he feared it would not live. It, however, left the hospital quite well with its mother. That was one of the results of the use of the double-curve forceps. Once a grip was obtained with one of these, it would never yield. In another case, that of a woman with her ninth child, there was a depression on the parietal bone of the child of $3\frac{1}{4}$ in. by $1\frac{1}{4}$ in. That child also went out with its mother well on the eighth day. With respect to the amount of force, and the yielding of the os, it is astonishing once you get the forceps in and begin to make gradual traction, in how short a time the os will become fully expanded. (Dr. Johnston, p. 268.)

Induction of Premature Labour.—In bringing on premature labour by detachment of the membranes from the uterine wall, it is most important not to rupture them. In a case in which I lately induced labour in this way I employed a long flexible gum-elastic bougie, passing it in a spiral manner across the fundus, without puncturing the bag of waters. I left it *in situ*, and labour, as desired, was brought on within nine hours; both mother and infant did remarkably well, without any evil consequences to either. The operation is by no means a difficult one, is perfectly free from danger to maternal structures, and not unfrequently saves many a patient from the perils of forceps, version, &c., and many more infants from death in utero. (Mr. J. C. Lucas, p. 271.)

Manual Dilatation of the Os.—Manual dilatation of the os uteri at or after the seventh month of pregnancy I can vouch, from a very considerable experience, to be an operation not difficult to perform if the accoucheur has a small hand. And, so far as I know, it is perfectly safe for the patient. In cases of puerperal eclampsia I have been able to open up the os when there was no dilatation whatever, by introducing one finger and dilating, then two, three, and so on, until the conoid hand passed in utero, in less than half an hour, and we know that nature does the same in less time. When there is hemorrhage the os uteri dilates easily and speedily under moderate pressure. (Dr. J. Wallace, Liverpool and Manchester Medical and Surgical Reports, p. 80.)

Procidentia Uteri.—*The Tow Pessary.*—In a case of complete prolapsus of the uterus, in which no pessary or support was of any use, the uterus was replaced and the vagina plugged with tow, which happened to be lying at hand, covered at the top by, and partially enclosed in, a piece of linen, greased at the outside. Although half a roll of tow was used no inconvenience resulted to the bladder or bowel. It maintained the uterus in its place, and was renewed as often as appeared necessary for cleanliness. The patient was soon able to renew it herself. Some time after her discharge it was heard that the patient was able to dispense with the use of the two pessary, and that the uterus never came down. A tow pessary might in many cases be used with success, and it has the merit of being incapable of doing injury to the parts with which it is in contact. It is easy of introduction; indeed, this patient soon learned to introduce it for herself. Being a compressible material, the tow would not keep the vaginal walls constantly on the stretch, like a solid body, but would rather allow them to contract gradually upon it, and thus prevent their losing their resilient power. The linen with which it is covered at the top and sides affords an easy means of withdrawing the tow for purposes of cleanliness, and the pressure which the tow exercises on the soft parts is equable, and so distributed that it causes no pain in any part with which it is in contact. Moreover, it is not liable to be displaced by any pressure or weight exerted upon it by the uterus itself or by muscular efforts in defæcation, for it clings, as it were, to the walls of the vagina; and this, combined with the resistance of the sphincter, effectually prevents it from being displaced. I am very sanguine in the opinion that a *tow pessary* will be found useful in various cases where pessaries are usually employed; but, at all events, I feel sure it will be found a most serviceable and effective means of removing the difficulties and annoyances of a *complete prolapsus of the uterus.* (Dr. E. Copeman, p. 272.)

Pruritus Vaginæ.—The author says a dilute solution of tincture of iron has been found an exceedingly effective remedy for this troublesome disease. It has been equally successful in his hands in cases of pruritus ani. In such cases he endeavours to ascertain if the patients are addicted to opium or chloral, as he has found pruritus caused by this class of medicines when habitually taken. The treatment is then of course obvious. In treating pruritus he does not neglect to give aperients, and he thinks the most suitable is an occasional saline in the morning; a Seidlitz will do very well if taken before breakfast. (Dr. Blair, Lancet, Nov. 14.

PUERPERAL FEVER.—This term embraces a number of diseases having different causes, symptoms, and anatomical lesions. Puerperal fever is produced by the absorption of a poison, either by infection from an acute specific disease such as typhus or erysipelas, or by generation of a poison within the generative canal, or inoculation of that canal by the examining finger of the accoucheur. This is not to be wondered at, for we know how difficult—nay, how impossible it is for some time to remove from the hands which have been engaged in making a post-mortem examination the odour of the cadaver, even by the most abundant ablutions and the careful use of disinfectants. We know, also, what a small quantity of septic poison is sufficient to engender a fatal disease even in a healthy person; but in the puerperal woman the poison acts at a great advantage, because her system is in more or less exhausted state after the parturient efforts, and it is engaged in throwing off waste products—the wasting from severe muscular action and from the involution going on in the uterus. Besides, the poison, when communicated by the examining finger, is introduced to a part capable of absorbing rapidly, and one which, at that time, is wounded, bruised, and sore from the mechanical violence to which it has been subjected. Under these circumstances the patient is peculiarly susceptible to the slightest contagion or inoculation. (Editor of Lancet, p. 274.)

There can be little question but that decomposing animal matter, however generated or introduced, is the origin of puerperal fever. Semelweiss says, "to prove that the poison was generated in the process of decomposition, and might be conveyed by the hands of attendants, a case of cancer of the uterus in a pregnant woman was the cause of a dozen fatal cases in the same ward, and the probable means of conveyance of the poison were the sponges and other things employed by the nurses, or in the course of examination by the medical attendants. We had a case, too, of necrosis of a knee-joint, which was also the cause of some fatal cases. These were clearly established facts, and they point to the same conclusion." At the conclusion of his treatise on this subject, Semelweiss brings his arguments together in a condensed form as follows: The excess of mortality in the first lying-in *clinique* in comparison with that in the second was occasioned by putrid matter, which was introduced by the hand of the examiner. I have shown that, in October, 1847, the foul material of a foul cancer of the uterus produced puerperal fever. I have shown that, in November, 1847, a decomposing material from a carious knee-joint pro-

duced puerperal fever; how the fever was connected with the visits of the surgeons in one hospital in particular, and how the mortality during six years was reduced to less than one per cent. when all connection with the surgical wards was broken off. It was the finger of the surgeon that carried the poison in the latter case; it was the atmosphere in the case of the knee-joint, and the air and the foul linen together in the *clinique* at Pesth, where the infection spread in spite of the washing with chlorine-water. (M. Semelweiss, p. 276.)

MISCELLANEA.

Anæsthetics.—The dangers of anæsthesia, so far as we understand them, are death beginning at the lungs, and death beginning at the heart. When a rabbit or other small animal is killed by chloroform, its death begins at the lungs. It perishes by asphyxia; and, after apparent death, which would pass into real death save for the aid of art, it may, as Dr. Richardson has shown, be easily resuscitated. We think it probable that death beginning at the lungs might be occasioned by ether, and that, if improperly treated, it might become death real and irretrievable. All such cases, however, would probably be remediable if taken in time; and would require nothing but the methodical conduct of artificial respiration. With chloroform and bichloride of methylene there is also the danger of death beginning at the heart, by a sudden paralysis over which the respiration exerts no influence; and it is probable that such cases are always fatal. From this risk it may, perhaps, be said that ether is wholly free; for there is a remarkable concurrence of testimony with regard to its power to sustain the heart, and also by maintaining dilatation of the capillaries, to prevent the heart from being overloaded by blood driven in from elsewhere. (Editor of Lancet, p. 340.)

Chloroform is as safe as ether if the proportion of thirty-three minims of chloroform to a thousand inches of air is not exceeded. But as they are generally given, ether is much safer than chloroform—being much less liable to arrest the action of the heart. I have tried many ways of giving ether, but have always found more resistance to breathing it than chloroform until I made use of nitrous oxide to render the patient partially unconscious, and to assist the action of the ether. Of nitrous oxide I think it may be said that it is the most pleasant of our anæsthetics, that although it destroys animal life it always stops the breathing some time before it stops the heart, and that if the chest is moved

enough to admit a very little air into the lungs, natural breathing returns more quickly than when it ceases from other causes. It is very rapid in its action, especially on children, and for tenotomy, reducing dislocations, moving stiff joints, and extracting teeth, it is unequalled. But it is not fitted for operations that require that the patient should be still for five minutes. Convulsive twitchings and delirium of a boisterous character are apt to occur. The combination of gas with ether modifies beneficially the character of both. The plan I now adopt is this: I give nitrous oxide only at first, and by degrees; without removing the face-piece, I turn a stop-cock, which allows a portion of gas, during expiration, to pass through a vessel containing ether, into an india-rubber bag, exactly like the supplemental bag; at the next inspiration this gas returns, bringing with it a portion of ether vapour, and mixes with the pure gas coming from the gas-bag. As the way to the ether is opened, the way to the gas-bag is closed. As soon as the ether begins to be supplied the tap of the gas bottle may be screwed tightly, and the escape-valve closed. In turning on the supply of ether, I watch for signs of its irritating the throat, and if it excites coughing or swallowing, I turn back the ether, to lessen its pungency. The patient is usually ready for the operator in sixty seconds; if any air gets between the face-piece it may require two or three minutes. As soon as the least stertor is heard, or any convulsive twitchings of the limbs is visible, I cautiously admit a little air, and keep supplying as much ether as I can without exciting cough. After about two minutes I remove the face-piece every fifth or sixth inspiration, unless, on account of air getting under the face-piece, the patient remains in a satisfactory state of coma without it. After a certain amount of ether has been taken the inhaler may be held so lightly as to admit a considerable quantity of air under the face-piece, but it is not often well to remove the inhaler altogether till the end of the operation. (Mr. J. T. Clover, p. 337.)

Ether v. Chloroform.—I have almost discarded chloroform and bichloride of methylene, both in hospital and in private practice, and, for adults, use ether as my sole anæsthetic. The secret of administration is to give ether enough, and to exclude external air until insensibility is produced. We sometimes use chloroform for young children, who generally take it kindly, and we sometimes give a few whiffs of chloroform to render irritable air-passages insensitive to ether, but that is all. The contrast between the effects of the two agents is very striking. An old patient, brought deeply under chloro-

form, generally becomes very pallid and bathed in sweat; but the same patient under ether would have a flushed face, and would be sustained and stimulated instead of being depressed. Chloroform and bichloride of methylene have no advantage over ether, except that they act a little more quickly; and the gain of a few seconds affords no justification for the sacrifice of human life. (Mr. R. B. Carter, p. 340.)

The committee appointed by the Royal Medical and Chirurgical Society to investigate the effects of chloroform found that "the simple failure of respiration, whilst the circulation remains good, almost always betokens a recoverable condition;" but that "the failure of the circulation to any considerable extent always involves extreme peril;" and "after the heart has stopped, recovery is but just possible, and is by no means the usual result of attempts to resuscitate." So that the danger from chloroform is precisely of that kind which it is most difficult to guard against, and which is most hopeless when it occurs. On the other hand, the same committee state that ether vapour stimulates the heart's action, and that the pressure in the vessels is maintained until there has been a manifest failure of the breathing. And Dr. Snow proved that it was impossible to paralyse the heart by ether inhalation. It is this stimulating property which gives to ether its greater safety, and enables us to use it not only as an anæsthetic, but as an antagonist to the shock of an operation. Under the influence of ether, as I have often pointed out, the patient may have a better pulse after than before even a severe operation. (Mr. W. W. Haward, p. 342.)

Essence of Mint.—*Antalgic Properties.*—Essence of mint exerts an influence on the sensory nerves comparable to that of chloroform, ether, and camphor. Dr. Savignac states that it has been found extremely useful in removing the itching and pain of pruritus; in alleviating, when employed in the form of injections of the leaves, the miseries of vulvo-vaginal hyperæsthesia, vaginismus, and neuralgias of the head and face; which are best treated by taking a small ball of wool of the size of a nut, which has been made to imbibe a few drops of the essence, and rubbing the painful part with it gently; it is then covered with a larger piece of wool, and and the whole is kept in position for a few minutes with the palm of the hand. The success of these external applications of the essence of mint in neuralgias of the face and head, and even in cases of congestive cephalalgia, has been both prompt and permanent. He admits, however, that the cause of the pain must be local for the cure to be permanent,

since if it be dependent upon hysteria, or be connected with intermittent fever or with gastric derangement, the primary cause must be dealt with by appropriate therapeutical means. (Dr. Delioux de Savignac, p. 298.)

IODINE. — *A New Method of Administering.* — Pills of iodised albumen present the advantage that the iodine is combined in a constant and known proportion. The iodine is completely masked, and its presence can only be recognised by destruction of the organic matter. This albumen is prepared by agitating actively an albuminous solution with iodine in very fine powder, or in solution in some appropriate vehicle. The mixture is at first highly coloured, blackish brown, but this colour gradually disappears after several hours of contact, and the preparation strikes a violet colour with starch. The product is then dessicated under gentle heat in an air bath, when it may be made into a pill mass. The dose is so arranged that each pill shall contain five milligrammes of iodine. The experiments at the Hospital Beaujon, by Prof. Dolbeau, have shown that iodine thus prepared has no bad effects whatever. The pills, in the dose of five or six per day, act rapidly in the resolution of an hypertrophy of the thyroid gland. Iodised albumen seems to have the efficacy of cod-liver oil. It has been administered in cases of chronic osteitis, ganglionic engorgement, strumous keratitis, and in two cases of Pott's disease with congestive abscesses. It may be continued for several weeks without gastric derangement or other inconvenience. (M. Collas, p. 297.)

JABORANDI.—Jaborandi is a native of South America. The dose for an adult is sixty to ninety grains, infused in boiling water. After the patient has drunk the infusion, with the suspended leaves, he should go to bed and cover himself with warm clothing. In about ten minutes the face, ears, and neck become deeply flushed; then soon drops of perspiration break out over the body, and at the same time the mouth waters; in a short space the perspiration rapidly increases, the sweat running down the body and soaking the clothes, whilst the salivation becomes profuse, running from the mouth sometimes in an almost continuous stream. In three of our cases the saliva amounted to an imperial pint, 22 oz., and 27 oz. respectively. The sweating and salivation continue from two to four or five hours, and simultaneously decline. There is a marked antagonism between jaborandi and belladonna in their respective actions on mucous membranes, whilst the former increases the secretions of most of the mucous membranes, the latter decreases or arrests them. Belladonna produces delirium, whilst jaborandi often induces

sleep. Both drugs, however, flush the face and quicken the pulse, and both act less powerfully upon children than upon adults. (Drs. Ringer and Gould, p. 329.)

LEECHES.—*To make One Leech do the Work of Two.*—If more blood be required than one leech would be likely to draw, the best plan is to make a free longitudinal incision, with a sharp lancet, into the creature when it is nearly full, and it will then continue sucking until detached, being no longer inconvenienced by the distension of its alimentary canal and integument. The incision should be made in the side of the leech, near its caudal extremity. (Mr. R. B. Carter, St. George's Hospital Reports, p. 124.)

OPIUM.—*New Test for.*—The colour test here described is at once so characteristic and intense, of such easy applicability and such extreme delicacy that it needs only to be more generally known in order to be often applied. Molybdic acid dissolved in pure sulphuric acid is the test fluid. A saturated, or at all events a strong solution should be made. The reaction is produced by the morphia in opium, not by the meconic acid: the latter undergoes no change with the reagent; the former in minutest quantities at once furnishes characteristic reaction. The best mode of proceeding is to place a drop of the suspected fluid side by side with a drop of the test fluid by means of a glass rod upon either a porcelain slab or slip of glass laid upon white paper. At once, if morphia or any of its salts be present, a beautiful deep maroon colour will be presented when the fluids are brought in contact. This colour changes after a while, becoming first deep purple, and then gradually losing its red element, and becoming shortly dark, and later a brighter blue. This blue colouration is maintained for several hours, but gradually fades out. (Dr. R. Southey, p. 307.)

PHOSPHORUS.—Phosphorus is a stimulant, possessed of special powers over the nervous system, which is, perhaps, affected primarily through the capillary circulation in closest connection with it. Free phosphorus is now generally acknowledged to be the remedy *par excellence* for conditions known as of brain exhaustion, for example; and that it is the most useful medicine at command in the debility which attends on spermatorrhœa. But, even more than this, Dr. Hammond, in his work on Diseases of the Nervous System, regards phosphorus, used in the small tonic dose under consideration, as the most valuable drug in the treatment of *softening* of the brain ensuing on its over-exertion. Phosphorus is a tonic: special, as restoring exhausted nerve-function, and as renovating, or

even rebuilding, altered nerve-matter; general, as affecting the body at large through the renewed nervous system. The dose given should begin at one-twelfth of a grain dissolved in a scruple or more of ether, to be repeated every four hours, or oftener. Probably no useful end will be served by repeating it oftener than every two hours. But I am very clearly of opinion that this dose in this form may, upon occasion, be advanced to one-tenth or one-eighth of a grain, or even higher still. As it has sometimes been thought necessary to force an alcoholic stimulant down a patient's throat until he *did* show some signs of recovery, so I have not hesitated, under appropriate circumstances, to increase the dose of phosphorus with a similar perseverance and confidence. But if it be desired to elicit the tonic powers of this drug, the medication must be pursued on an entirely different plan. First of all the formula to be employed may be a more pleasant one—a pill. One-hundredth of a grain in a dessert-spoonful of oil taken twice a day, will be found the most useful dose and form for procuring tonic effects with phosphorus in the majority of cases. Cod-liver oil is the only oil which is known not to interfere with the action of phosphorus, or to expose it to change. It has further the great advantage of entirely concealing the odour and taste of the drug. (Mr. J. Ashburton Thompson, British Medical Journal, Nov. 7., p. 584.)

Rhamnus Frangula as a Substitute for Castor Oil.—A fluid extract of the bark of Rhamnus frangula, or black alder tree, one drachm being equal to one drachm of bark, is an aperient which possesses all the advantages of castor oil without its disadvantages. It is a mild laxative, its action being unaccompanied by griping or other disturbing symptoms. This extract is a dark brown thickish fluid, with a rather sweetish and far from disagreeable taste. The dose of course varies according to the effect desired, the age, and the condition of the patient; but I have proved from experience that the quantity suggested by the makers of the extract—viz., one to two drachms—is, as a rule, too small for an adult. For a child one drachm is sufficient, but for an adult a dose of from two and a half—that is, an average dessert-spoonful—to five drachms is necessary, and I generally order the following: ℞. Extracti rhamni frangulæ liquidi, ʒ v., aquæ ad ʒ j., M. sig.; the half to be taken in a wine-glassful of cold water, and should the bowels not move in four hours the remainder to be given; or the first dose at night, and the second in the morning should no motion have taken place. The effects are much akin to those I have mentioned

as the advantages of castor oil, but there is no nausea, there are no eructations, and there is no griping. (Dr. J. C. O. Will, p. 332.)

STRYCHNINE.—*Iodic Acid as a Test for.*—It occurred to me that iodic acid would prove a far more delicate colour-test for the presence of strychnine in very minute quantities than any of the ordinary oxidising agents ordinarily recommended for employment in the standard works on forensic medicine—bichromate of potash, peroxide of manganese, ferrocyanide of potassium, black oxide of manganese, &c.; for these are all substances which, either in solution or mixture with fluid, possess colour in themselves, and although it is not one single colour, but a play and successive change of colours, that signifies the presence of this particular alkaloid, still a colourless test solution appeared to me a real desideratum. As a class experiment I found a saturated solution of iodic acid answer admirably, not by producing any play of colours when warmed in contact with strychnine, but by evolving an invariable pink-rose tint, which lasts for some little time —an hour or more—and gradually fades out through flesh to a fawn coloured substance. (Dr. R. Southey, p. 305.)

TANNIN.—*Local Use of.*—To prepare it of full strength, an ounce of perfectly fresh tannin must be mixed with six drachms of water, in which it readily dissolves. This solution is a thick fluid, of the colour and consistence of treacle, which keeps much better than tannin itself. The strong solution of tannin is a most powerful astringent, almost free from irritating properties. It is one of the best dressings for wounds—far superior to collodion, and even less irritating than the styptic colloid, which it somewhat resembles. If applied by a brush and allowed to dry, it soon forms a pellicle which excludes the air, and gives ease to pain. It may be applied to almost any form of ulcer, and to wounds after amputations or other operations, especially when not very deep. It answers well, for instance, after the operation for harelip, painted over the pins and threads, in the same way as collodion is sometimes used. Strong tannin solution applied to the ulcerated skin of ingrowing toe-nail at once removes pain. After one application, the offending corner of the nail may be readily raised, a little lint inserted underneath, and the nail allowed to grow up. Among many cases, I have in this way cured one in which evulsion, twice performed, had proved only a temporary remedy, the disease being reproduced each time the nail grew up. For cracked nipples, Martin's solution, diluted with an equal quantity of water, is the best application, and corresponds to the tannin-

solution commonly used for this purpose. Enlarged tonsils may be reduced by daily brushing with Martin's solution. This treatment, though vastly inferior to extirpation, or even to the application of potassa cum calce, is painless, and therefore, in some cases, useful. Bleeding warts may be readily removed by this application, as also by the perchloride of iron. I have found the former to readily reduce the granulations from an unhealed umbilicus in an infant. I have long been prepared to use Mr. Martin's solution in any case of severe uterine hemorrhage I might meet with, as Mr. Thomas suggests, but have not yet had occasion to do so. (Mr. Philip Miall, p. 303.)

Salicylic Acid, a New Disinfectant.—It is used for medical and surgical purposes either dry or in solution. When used dry it is sprinkled on to wounds, ulcers, or dressings in the form of very fine powder, in very small quantities, either simply powdered, or mixed in various proportions with some diluent, such as starch. When used in simple solution either for spraying surfaces, or for washes or gargles, it is used in tepid solution of about one part to 300 parts of water. Where stronger solutions are required for washes, gargles, or to moisten dressings, one part of the acid and three parts of phosphate of sodium to fifty parts of water have been used. When applied to wounds it appears immediately in the urine. Its alleged advantages over all other antiseptics are—first, that it is far more powerful and effective in smaller quantities; and secondly, that it is, in all quantities necessary for complete effectiveness, entirely devoid of irritant action upon the living tissues. It is not caustic nor corrosive in any quantity, and never produces inflammation. In large quantities it may be irritant and painful, but yet rarely surpasses a stimulant effect, while it appears to be quite neutral in the very small quantities which are yet thoroughly effective; thirdly, it is said to reach and prevent processes of decomposition which are beyond the reach of all other antiseptics or antiferments. (Editor of Medical Times and Gazette, p. 289.)

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

Art. 1.—ON THE ACTION OF THE SEPTINOUS POISONS ON THE PRODUCTION OF FEVER.

By Dr. B. W. Richardson, F.R.S., &c.

In a lecture delivered by Dr. Richardson before the Society of Medical Officers of Health, at their last meeting, a new theory was offered on the action of the poisons of the contagious diseases in the production of symptoms which mark those diseases, and especially the symptom of fever. In a lecture delivered before the same Society, in the year 1865, the author detailed his original experiments on the poisonous action of an organic substance he had obtained from the sero-sanguineous fluid that had been removed by Mr. Spencer Wells from the peritoneal cavity of a woman suffering from pyæmia after the operation of ovariotomy. To this organic poisonous substance he (Dr. Richardson) at that time gave the name of septine, and he showed not only that it would communicate fatal disease to an inferior animal, but that the same disease could be communicated from the secretions of the primarily infected animal to other healthy animals in direct series. He also showed in the same research that the organic poison could be made to combine with acids so as to form salts which retained the poisonous qualities of the original substance. That a similar poisonous substance is present in decomposing blood, and that the poison can be transmitted in a series of animals, have since been confirmed by the independent researches of many physiologists, and the fact may be considered as fully established, although great difference of opinion still remains as to the nature of the organic product, some assigning to it purely physical, others vital properties.

We may be able by and by to discuss these different views at length. At present we are intent only to indicate the new theory which the author, whose communication we now notice, offers as to the mode in which the organic poisons produce their peculiar effects. On this important inquiry he has been

occupied ever since his researches in 1865, and the result is to the effect, that the poisons exert their deleterious action through the property they possess of setting at liberty the oxygen of the blood in undue quantities in the extreme circulation. By way of experimental demonstration, Dr. Richardson took specimens of solutions of peroxide of hydrogen, and inoculated them with points of different organic poisonous animal substances,—viz., decomposing blood, pyæmia poison, pus, fibrine, and vaccine lymph. In the presence of all these bodies, oxygen began to be immediately liberated from the solution. Other organic substances—mucus, for instance—would not liberate oxygen, a fact which could be applied (as was shown by an experiment) for diagnosing mucus from purulent matter. Proceeding with his demonstration, Dr. Richardson charged blood with oxygen from the peroxide solution; then, by inoculating this blood and setting oxygen at liberty, he showed the temperature of the blood rose 4° Fahr. In his further observations, he explained that these organic disturbing substances are themselves decomposed in the process of the change they excite, and that they all seem to be derived originally either from fibrine or cellular tissue.

The conclusion arrived at, and which was advanced admittedly as a theory in its present state, is that the fever-producing poisons act in the way described by setting oxygen free in the blood in undue proportion. The theory, it was urged, explains the phenomenon of remittency. The accession of fever is due to the presence of the poison, but as the poison becomes destroyed the disturbance ceases until a new charge is locally produced and carried into the blood. The theory also explains the phenomena of those malignant contagious diseases in which death occurs very rapidly, with symptoms of asphyxia and convulsion. Here, it is assumed, the liberation of oxygen is sudden and complete, and the blood so surcharged with poisonous matter that it cannot duly absorb and fix oxygen in in the pulmonary circuit. Thus an asphyxia commences from the blood itself.

Some therapeutical considerations brought the lecture to a close. It was shown that certain medicinal substances, among which quinine was specially named, counteract the different poisons in their power of liberating oxygen.

Our readers will gather from this summary that a new field of inquiry on the subject of the poisons of the contagious diseases is opened by these researches. That the inferences drawn support the physical side of the question may naturally be expected, coming as they do from an author who for so many years has been one of the most prominent exponents of the physical theory of contagion.—*Lancet*, *April* 3, 1875, *p.* 490.

2.—ON MALARIAL FEVERS.

By Dr. T. INMAN, Consulting Physician to the Liverpool Royal Infirmary.

The so-called malarious diseases are due to cold or chill after exposure to great heat, especially after it has been accompanied with exhausting labour.

Than this hypothesis, nothing can be more simple. Every doctor in Great Britain is aware how frequently bronchitis, pneumonia, and other severe affections, are attributed to cold—borne by a person who has been previously exhausted by exercise in a hot atmosphere—or by the sweating which labour produces, even in winter. If we see a navvy, teeming with perspiration, lie down and sleep in a draught, or on a cold stone, we say to ourselves, "that he will be lucky if he do not require a doctor."

There is, then, *à priori*, something reasonable in the idea, that an excess of heat and cold will produce analogous and more severe results. Now, in England, the difference between the day temperature and the night, is barely twenty; 90 degs. in the shade by day is about 70 degs. in the shade by night; but, in malarious districts, the temperature by day for those working in the sun (and it is those who get the fever), is about 140-150 degs.; at night, this falls to about 50-45 degs. Again, it is known, that during frost, such as the French Army experienced in the retreat from Moscow, the cold is bearable; but when a thaw sets in, and the cold is moist, not dry, frost-bite is common.

Every notoriously malarious district is marshy; consequently, those who live therein, are subject to more severe variations of temperature than those who live in dry places. During the day, the hot air over a marsh or lagoon is saturated with dissolved water as soon as the sun is low, and still more after it sets. This water is *precipitated*, and we have a cold dew—did ever any one hear of a hot one?

I have emphasised the word "precipitated" because it involves a most important point. If the word be used correctly, there can be no emanation from the ground during the time the aqueous particles are falling. I need only point out, that terrestrial emanations only take place by day, and must cease at night; yet night is the fatal half of the four-and-twenty hours. Night is also the coldest part of the day in every country, and the cold is most intense when there is nothing to intervene between the earth and stars.

It is well known that the Pontine marshes are only dangerous after sundown, and only then to anyone who cannot keep himself warm. Dr. Oldham tested the malarious theory, by sleep-

ing, for many months together, on a bed placed in a swamp, and barely two feet from the ground. There were atrocious stinks, and his nostrils suffered accordingly; but he always wrapped himself up warmly, and never got fever that way. He did get it once before, and that was in the room of his superior officer, and under the following circumstances. He had ridden, in the heat of an Indian day, to deliver a report, and was perspiring; when he arrived, the room occupied by the colonel was cooled with a punkah, and the doctor was suddenly chilled, and could not leave the house, for he instantly was struck down by fever. His book contains many such cases.

This will serve to introduce the reason why fever has attended disturbance of the soil. Men work hard, under a hot sun during the greatest part of the day; when night comes they are tired, glad of something to drink, take too much, and sleep too heavily, to be awakened by the cold. The blood has, so to speak, been boiling all day, at night it is chilled almost to the freezing-point—hence the fever, which may show itself as intermittent or remittent; or as the attendant of dysentery hepatitis, pneumonia, &c.

Consul Hutchinson in Peru noticed these causes in operation, and was not surprised at their results. In some parts of South America, to "catch a cold" is "to get an ague," the expressions being synonymous.

In the Ashantee expedition, the alternation between daily heat and moist nightly cold was enormous; and any one who has read of the excessive exertion, and consequent fatigue, undergone by the men, whilst the sun was above the horizon, and the cold which they had to endure when that source of heat had set, can readily understand why the fevers which the soldiers had were so severe. Had the men not been partially sheltered, by the forests which they traversed, from the radiation of their heat into space, matters would have been infinitely worse. Even horses who sleep in the open air in Arabia, become diseased; all the valuable ones are sheltered during the night by some sort of cover, which prevents chill.

Warmth it is that prevents getting fevers. A friend of mine, who lived at Sierra Leone for years, never had even a touch of fever; for, during the wet season, he habitually warmed his rooms with a stove, and always was warmly clad.

These observations have a practical bearing; for if there be such a poison as "malaria," we cannot absolutely guard ourselves against it; but, if it be true that the diseases attributed hitherto to malarious miasms are really due to severe chill after great heat or great exertion, we can arm ourselves against them. How severe and sudden may be the effect of a chill,

the following will show. A medical friend of mine living in Cheshire, saw, one day in May, a maid of his, who had been engaged in washing, and was bathed with perspiration, standing in a draught of air to cool herself. He sent her away from the door, but, ere the day was over, the woman had general dropsy; the urine passed in twenty-four hours amounted only to half an ounce, and was full of tube-casts, though not albuminous. Surely, no one would say that she had imbibed a poison from the soap-suds; nor, had she been delving, would one say that she had been poisoned by the terrestrial effluvia. Until the teachers of our youth have a larger capacity for inquiring into old facts, with the light of modern science, and for basing their instruction upon logical deductions, rather than what are called "time-honoured facts" —because they have been asserted for a century or two, though not facts at all—the practice of our profession will not improve, not being based upon sound knowledge.

If a soldier be taught that agues, &c., come from "soil," he takes no precaution when no "soil" is present to produce them; and then, when a *medico* finds a detachment ill with intermittents or remittents, he feels helpless to prevent the spread of the disease. On the contrary, had he been taught truly, he would study the air as well as the earth, and remember the dictum of the Indian colonel, who said to Dr. Oldham, "You doctors may talk of marsh-poison as you like; but my experience has taught me that hot days and cold nights are certain to produce fever."

To my mind it appears strange that an ague-fit coming on after a gravel-walk has been raked, or a pit dug, must necessarily rise from a disturbance of the earth. I can recall plenty of cases in which ditches full of vegetable *dèbris*, stagnant ponds, and soil of all sorts, have been dug out and dug over. In one, this process was marked by an attack of sciatica in the master; in another, by gout; in another, by chicken-pox; in another, by pneumonia; in another, by a drunken bout; in another, by catarrh; in another, by paralysis; in another, by chorea; and in another, by gonorrhœa. Would not every one "write me down an ass" if I associated any one of these complaints with an upturning of sods, delving ditches, taking up potatoes, storing carrots, turnips, or mangold, or with other farm labour? Then, if an attack of ague should come on, are we to be asked to jump to the conclusion that the complaint was caused by raking a gravel-walk, or digging a grave in the nearest cemetery? Again, correspondents have avoided the very important point, that emanations, whether from marsh or river, trench or pit, are the most abundant and incessant during the heat of the day, a period when nobody

pretends—except in such cases when the body is suddenly chilled by a hailstorm, or by wading through cold rivers, or by a cold wind from the mountains, or simply by a drying zephyr when the body is covered with thin garments soaked with perspiration, rain, &c.—that agues are caught. The well known Moremma and Pontine marshes and the Campagna around Rome are innocuous during the day, when the sun is hot and every emanation strong.

When night falls, and emanation ceases, then comes the danger of ague, &c. Clearly, then, the cause must be sought in a something which there is in common between nights in general and those conditions that will give ague during the day. This something, most unquestionably, is not malaria, or an emanation from any soil.

I commend the inquiry to those whose experience is commensurate with their acumen. I am quite aware how easy it is to try to put down a thinker by an array of so-called facts; and I have known a "stay-at-home" astronomer convict of inaccurate observations the whole of the officers of an exploring expedition who insisted that their chronometers went wrong for three days, under the influence of a land-breeze from Australia. The head man was not so silly as to stick up for the malarious effect of proximity to land, but re-examined his calculations, and discovered the error.

Some writers seem wholly to have misunderstood the bad effect of sleeping on the deck of a ship being dependent upon (1) hard work and exhaustion under a hot sun; (2) sleeping where the body is certain to be chilled by radiation or a cold land-wind; and they make merry over the fact that many are taken ill between decks. Unquestionably they are, when all the air-holes are kept open, and admit a chilly land-breeze. Men on board ships in the deadliest African rivers escape fevers—as far as they are caught on shipboard—by closing the windows at sundown. At sea, the air in the tropics is equable day and night, when not chilled by a cold land-breeze. In like manner, one may cross the Pontine Marshes by night, by excluding from the carriage in which one rides the bitter cold; not that which we call bitter in England, but very severe to those accustomed to a day temperature of 140 degs. in the sun and 88 to 92 degs. in the shade, and who are too lightly clad to bear a sudden fall to 60 or 50 degs. during the hours of darkness. No amount of experience in the field can alter the physical fact that in many places in hot climates the nights are colder than the days, especially when the sky is clear. Even frost occurs occasionally by night on the Sahara; and the Arab always keeps his most valued horses under cover after sundown, and in good stables too.—*British Medical Journal, Jan.* 2, *and Feb.* 6, 1875, *pp.* 7, 172.

3.—REMARKS ON TYPHUS FEVER, AND THE ADMINISTRATION OF ALCOHOL AND DIGITALIS IN THIS DISEASE.

By Dr. H. Macnaughton Jones, Consulting Physician to the Cork Fever Hospital.

I desire to make a few remarks on the administration of alcohol and digitalis in fever. It is strange that even to the present moment physiological observers are so divided in reference to the essential points in the physiological action of alcohol, and assign to it such opposite physiological and therapeutical properties. Dr. Parkes said, in 1870, that as the narcotism and a great rise in the frequency of the heart's beats occur at the same time, it is clear that it is attributable to a nervous implication, it does not reduce animal heat (except in toxic doses), it does not arrest the metamorphosis of tissues or the elimination of nitrogenous excreta. "It appears to us unlikely that it can enable the body to perform more work on less food, though by quickening a failing heart it may enable work to be done which otherwise could not be so." Comparing it to the spur in the side of a horse—"eliciting force, not supplying it;" recognising its use in "exciting a feeble heart, accelerating a languid capillary circulation," there being "no agent requiring more skill to obtain the good and avoid the evil which its use entails," and as the result of the experiments recorded before the Royal Society, February, 1874, the conclusion arrived at was, that alcohol in dietetic doses neither lowers nor raises the temperature. The contractions of the heart were increased in rapidity and force, the period of rest shortened, this increased work being compensated for, in the case of moderate doses, by a corresponding diminution of work when the alcohol was stopped. At the same time the capillaries are dilated, and allow the blood to pass more freely through them. Taking the mean pulse of the non-alcoholic days, and contrasting it with the six alcoholic, Dr. Parkes showed (1870) how the heart performed *one-fifth* more work on the fifth and sixth days, the heart during the alcoholic period doing daily work in excess, equal to lifting 15·8 tons one foot, and the last two days, 24 tons raised the same distance.

On the other hand, Dr. Wood, in his recent complete work on "Therapeutics," quotes Dr. Franz Reigel's experiments, which go to prove that there is a slight anti-pyretic property in alcohol; he remarks on its absence in those who drink stimulants habitually, and that its anti-pyretic action is lessened by its continued administration, and he draws attention to the speedy return of the temperature to its "previous grade." He cites the experiments of Binz to show that it is not through the nervous system the alcohol acts, but that it lowers temperature

by directly checking tissue metamorphosis. There appears to be a still greater variety of opinion as to its action in retarding or promoting the elimination of carbonic acid. The more important point remains—the value of alcohol as a dietetic agent.

It would be impossible and useless, to enter into the various views put forward on this essential matter. Dr. Wood quotes Baudot, Schulinus, Anstie, Thudichum, and Dupré, as ranged on the side of non-elimination; and he himself, it appears, strongly holds to the views that alcohol is a food, and that it is, in great part, changed in the systsm. Dr. Wood relies greatly on the experiments of Dr. Ford (*New York Medical Journal*, 1872), who discovered alcohol in liver tissue and the thoracic blood—corroborated, apparently, by those of Dupré and Bechamp (1873), who discovered alcohol in the urine of teetotallers, the latter in sufficient quantity to burn it. Dr. Wood concludes that alcohol "in small amount is an arterial and cerebral stimulant, increasing functional activity in the nervous and circulatory systems;" "is a food in the sense that it is destroyed in the system and discharges a physiological office; is a retarder of tissue changes; is oxidized in the body; generates force; and considers that in it we have a means of sustaining the system during the train of an acute exhaustive disease." Dr. Wood has evidently great faith in its action in advanced cases of fever, repeating the celebrated rules of Graves, that as long as it lowers the temperature and pulse, moistens the tongue and skin, and quiets delirium, it does good; but with a bounding, rapid pulse, dry skin and tongue, a "*restless*" patient, stimulants do harm.

I have thus instanced one, out of the many, of the most recently-published expressions on this question. Whatever may have been the views of our celebrated Irish physician when he prescribed these rules for the exhibition of stimulants in fever, and when he recognised the absurdity of the old depletory and antiphlogistic measures, and the vital importance of support and nutriment, certain I am that with our knowledge of the action of alcohol and its questionable dietetic and force-producing value, he would have carefully qualified his directions to "feed fever," and have laid down much stricter rules and precautions for the exhibition of such stimulants than are embodied in those above alluded to. The patient whose skin is moist, whose tougue is not brown and dry, whose pulse is not rapid, or temperature increasing, and whose brain is quiet, had better be let alone; the exhibition of alcoholic stimulants to such a one appears to me fraught with danger, and to push their use until these common attendants on their administration manifest themselves (when, in a large majority of cases, a

patient may be guided through even a bad type of fever without them), seems to me rash in the extreme. If we have "to apply the spur to the side of the horse," let us, at least, not waste his energy and exhaust his force before both are required for a final effort, and at a time when he is straining his utmost to win the race for life, assisted by his own mettle, neither over-weighten by useless material, or irritated by incessant applications of the stimulating whip. True, it does not appear, from any experiments hitherto made, that the temperature or respirations are increased by the exhibition of small doses of alcohol repeated, but we know that the heart's beats are, and the surplus force elicited must find some correlative expression, and though as heat, that manifestation in a condition of health, as indicated by a thermometer, at the surface of the body, may be slight; yet it appears to me that in such a disease as fever each additional action will partly find its equivalent in heat generated, and so, at least, assist in maintaining and not lowering the temperature. The internal work done by a man's heart has been calculated at 500,040 pounds out of the 1,610,206 of total work done by the body in twenty-four hours; this is entirely dependent on the force and frequency of the movements performed by this organ. It appears manifest that an agent which can materially increase this work, alter its character, or misdirect its expenditure, laying aside its effects on the heat generated by this elicited force, must be very cautiously administered.

We may, I believe, as far as our present knowledge enables us to judge, conclude that alcoholic stimulants in fever, are useful to keep up the calorifying process, where the tendency (as in many cases of fever undoubtedly is the case) is to a great depression of temperature, and consequent death (*vide* Carpenter 488, 7th edition). In this condition of impending exhaustion, with low temperature and inability to generate heat, stimulants undoubtedly are our sheet anchor; and they enable us, when we see a patient threatened with a complete consumption of the normal body-force, to elicit, by the powerful stimulus given to the nervous system, that which is latent in the system, and so to tide over a period of unusual demand, which may prove too much for the over-taxed organs; thus we gain time both for the exhibition of remedies, and also to administer true force-forming nutriment and support.

I will briefly now record the opinion I have formed of the use of digitalis in fever, from its administration in a large number of cases. It is not necessary to say a word on the action of an agent, the effects of which are so thoroughly understood, and when its mode of action has been (as a cardiac stimulant), so fully investigated by Traube, Pelikan, Dybkowsky,

Fothergill, Handfield Jones, Fuller, Ackermann, Malan, Boehm, and others. The treatises by Fothergill and Lauder Brunton will well repay perusal, explaining thoroughly the action of digitalis on the cardiac inhibitory apparatus, and also the cardiac ganglia. "The following proposition," says Dr. Wood, "expresses our present knowledge, and probably is very near to the truth. Digitalis, in moderate doses, stimulates the musculo-motor portion of the heart (probably its contained ganglia), increases the activity of the inhibitory apparatus, and causes contraction of the arterioles." I believe that the experiments of Eulenburg and Ehrenhaus, as mentioned by Dr. Fothergill, have put it beyond question, that, independently of any action which digitalis may have on the inhibitory apparatus, it directly affects the rhythmical action of the heart through the cardiac ganglia. That digitalis has the power of steadying the pulse, rendering it firmer and less compressible, has been for some time known, its dangerous effects only becoming manifest when it is pushed too far, or toxic doses administered. Then the arterial pressure falls, and the pulse passes from the slow and steady to the rapid and weak. It it clear that in typhus the inhibitory action of the vagus must be lessened; so also the rhythmical power of the cardiac ganglia is interfered with. This is shown by the rapid and weak action, by the character of the pulse; there is a diminished arterial pressure and tension. Dr. Grimshaw, of Dublin, drew attention to this fact, in connexion with the action of digitalis, so far back as the year 1867. As it is universally agreed that digitalis possesses, in therapeutic doses, the property of exciting the inhibitory action of the vagus, and of increasing the arterial pressure, we might naturally assume that, in such a disease as typhus, with its quick compressive pulse, it would be indicated; but again, it appears to me that the result to be desired from the administration of a drug in typhus would be the consequent diminution of the internal work done; a conservatism of force and prevention of waste. I cannot reconcile increased action of the circulatory and respiratory organs in consequence of an abnormal stimulation without a correlative manifestation in an evolution of heat, and I take it that, in many cases of fever, in which the temperature, towards its termination, is gradually lowered to a dangerous degree, or suddenly falls, it is because not only has the natural body-heat been expended, but its latent reserve fund has been encroached on, its force, represented as heat, is exhausted, and there is no power in the system to elicit it. To enable the body, with the least expenditure of force, to tide over its period of extra work, to modify and restrain the general process of combustion, which is taking place in excess, must be our object. In fever the question is—does

digitalis assist us to do this? I believe it does. I am not surprised that digitalis, in toxic doses, raises the temperature; here we are brought again to diminished arterial pressure and a rapid pulse; as in typhus fever, the balance between the musculo-motor power of the heart and the inhibitory apparatus is upset, and from this rapid action we might, I think, expect a rise in temperature. Does clinical experience show that digitalis has this direct antipyretic effect? Wunderlich, our greatest modern authority on the temperature in acute disease, states that it has a decided antipyretic value in typhoid fever; and we know that it has been given as an antipyretic in other acute diseases, as well as in fever. I have given digitalis, *watching carefully its effects on the temperature*, in over two hundred cases of acute disease—simple fever, typhus, typhoid, pneumonia, pleuro-pneumonia, delirium tremens, remittent fever, &c., by itself or combined, and I have no doubt of its antipyretic properties. That these will be manifested suddenly, or follow immediately on its use, or that they will be apparent in every instance of the administration of the drug (no more than the effects of any other medicine, when given in moderate doses, invariably follow) is not to be expected. On the contrary, its mode of action is subject to great variations in this respect, in different patients, and often in the same patient. I would say that its antipyretic action, as shown by a characteristic fall, in many cases, is uncertain, or there may be an unaccountable rise during its administration, and a corresponding fall subsequently. Yet that it influences the temperature, in some cases, rapidly, in others slowly is to my mind, beyond a doubt. I would not expect, from what we know of the physiological action of digitalis, a very marked and decided fall in temperature, though I have frequently seen this, and at periods not connected with defervescence; what I would rather hope would be a restraining power, a limiting of the range, a gradual, but marked fall, and this is exactly, in the majority of cases, what clinical experience has shown me is the case. Any one who compares a number of charts of cases in which such an antipyretic as quinine or nitrate of potash (in large doses) has been given, with those in which digitalis has been used, will at once be struck with the difference in their action—the marked dip in the one and sudden fall, with corresponding diminution of pulse-beats, the gradual decline of the other, with an equally slow reduction of the pulse. Briefly, I may summarise my experience of its use in typhus thus:—

1. *Pulse and Respiration.*—It has (not constantly) a well marked effect in changing the character of the pulse, strengthening it, improving its tone, rendering it less compressible, at the same time that it gradually lowers it, and, if

pushed for a lengthened period, generally reduces it to between 40 and 60; this result being obviated by watching the temperature, and ceasing the administration of the medicine on its marked reduction; never exceeding moderate doses of the drug, and repeating these at intervals dependent on the *general condition of the patient*. The respirations, as a rule, decrease with the pulse.

2. *Temperature.*—It appears, in a large majority of cases, to perceptibly affect the temperature within two days after its administration, in moderate doses—say twenty drops of tincture, or half an ounce of infusion or both combined—every three or four hours (I generally give twenty drops of chloric ether with it, as I find that this renders it more tolerant to the patient); the reduction of temperature will, to a great extent, depend on the quantity of the drug administered and its regular exhibition; the rise or fall being materially influenced by the continued use of the drug night and day. In a large proportion of cases I treated, it was not given at night; in some it was, and in these latter the characteristic action was much more speedily manifest. In some cases this effect on the temperature is not so apparent; this I notice more particularly in cases with very heavy eruption, also in fatal cases; in others great variations in the temperature, without any apparent cause, take place during its administration. On young patients its action is particularly marked as a rule.

3. *Length of the Fever.*—I cannot say that it appears to decidedly influence the duration of the fever; in most of the cases in which I administered it, the fever was not of long duration, a large number terminating from the fifteenth to the eighteenth days.

4. *Nervous System.*—This was one of the most marked results. There appeared, in a large majority of the cases, to be complete immunity from delirium. I had only two cases, during the past twelve months, treated with digitalis and *without alcohol*, in which there was what I would term "high delirium." Most of the cases went through the fever quietly, and there was a marked contrast to those in which I had been in the habit of giving the latter.

5. *Tongue and Skin.*—The tongue (particularly in those cases treated without alcohol) was moist in nearly every instance, and there was a noticeable absence of the hard, brown, and dry tongue, so characteristic of this affection, especially when wine is administered. I could not say that there was any marked effect on the petechiæ, save their early disappearance in a large number of cases; this, however, might only be coincident on their favourable course and termination. I was also struck by the absence of critical sweats.

6. *Urinary Secretion.*—The secondary effect of digitalis on the kidney was apparent in the free secretion of urine in nearly all the cases treated with it. In cases treated without alcohol, with or without digitalis, I found convalescence quicker, less consequent debility, and I believe with Dr. Grimshaw, that the administration of the digitalis lessened the necessity for alcoholic stimulants of any kind. In few of my cases did it produce vomiting.

Conclusions.—On the whole, then, I have arrived at these conclusions:—

1. That in the treatment of fever, typhus and other forms, too much reliance has been placed on *alcoholic* stimulants, and that fashion, rather than reason, has swayed many in their *indiscriminate* employment.

2. That the per-centage of cases requiring such stimulants is a low one; and that while our administration of them, as regards quantity and kind, must depend entirely on the condition of the *patient*, still the utmost caution (with our present knowledge of their physiological action) is required.

3. That in digitalis we have a powerful cardiac stimulant, which, while it gives force to the heart, does not do so at the expense of the system, but rather in a conservative agent, which controls expenditure and limits waste of vital action—always, of course, remembering that a large number of cases will recover without any specific treatment, save that care and guidance which provides for the wants of the system, and secures the patient from the risks of complications. That digitalis appears to be indicated in the early periods of many cases of typhus in which we have a rapid pulse and high temperature range, regulating our administration by its effects on both, using it, rather, with the object of guiding the patient up to a certain point, than of curing the disease.—*Dublin Journal of Medical Science, April*, 1875, *p.* 313.

4.—ON THE PATHOLOGY OF SMALL-POX AND TYPHOID FEVER.

By Dr. T. Lauder Brunton, F.R.S., Lecturer on Materia Medica and Therapeutics at St. Bartholomew's Hospital.

In a paper communicated to the Royal Society in June last, Dr. Klein announced the interesting fact that he had discovered the presence of a vegetable organism, a fungus, in fact, in the pustules of sheep-pox. Sheep-pox possesses a specific virus of its own, and is not the same disease as small-pox, for it cannot be communicated to man; and the different stages of papules, vesicles, and pustules are not so sharply defined as in small-

pox. Nevertheless, it resembles small-pox so closely, both in its course and in the anatomical lesions which occur in it, that there can be little doubt that both diseases have a similar cause. If sheep-pox depends on the presence and growth of a fungus in the skin, then in all probability small-pox does so too; although the two diseases may be caused by different species of fungus, one of which will only grow in the skin of the sheep, while the other will only thrive in the skin of man. It is difficult to obtain pieces of skin from small-pox patients, for the sake of examining them microscopically at every stage of the disease, but sheep-pox may be readily studied, for animals inoculated with it may be killed and their skins examined, as often as is necessary. In the hope of thus discovering indirectly the cause of small-pox, Dr. Klein carefully observed the microscopical appearances of the pustules in sheep. He found that for the first two days after the pock begins to appear, there is little or nothing by which to distinguish between it and any ordinary inflammation. The lymphatic vessels of the corium are filled with a granular material, resembling coagulated plasma. About the third day, however, the contents of the lymphatics begin to exhibit very peculiar characters, for organisms of a distinctly vegetable nature appear in the granular matter. The granules begin to proliferate and form necklaces which give rise to filaments. The lymphatics now contain round or ovoid bodies and branching filaments. The filaments are sometimes separate from one another, and easily distinguishable: at other times, they are closely interlaced and form a felt-like mass. They grow rapidly, and in one or two days they fill most of the lymphatics of the corium. The masses which they form are now found to consist of the same elements as ordinary mould, viz., a spawn or mycelium of filaments, frequently jointed, from which other secondary filaments spring and bear the fructification or conidia. When the pock reaches the vesicular stage, the vesicles are found to contain masses like those in the lymphatics, but with thinner filaments and smaller conidia. Lymph corpuscles now wander in great numbers from the corium into the vesicles, and thus convert the fluid into pus; while the corium, previously crowded with them, becomes entirely free from them, and pustulation is complete.

If a little of the lymph just described be taken from the vesicles it will, when inoculated, communicate the disease to another animal. The virus has been shown by Chauveau and Sanderson to be contained in the solid particles, and not in the fluid part of the lymph, and it is therefore highly probable that these fungi are the *materies morbi* in sheep-pox. This being the case, it follows, as has already been said, that a

fungus of a similar kind is, in all probability, the *materies morbi* in small-pox.

The success of these investigations has induced Dr. Klein to extend his researches to the pathology of typhoid fever, and in this disease also he has succeeded in demonstrating the presence of a fungus. In sheep-pox the skin is the part where the disease chiefly manifests itself; in typhoid fever the intestine is the part which is chiefly affected. Accordingly we would expect that if the disease depends on the presence of a fungus, it would be found most readily in the skin in sheep-pox, and in the intestine in typhoid fever. According to Dr. Klein's observations this is indeed the case. The researches which he is conducting on this subject for the Medical Department of the Privy Council are not yet completed, but he has published a short preliminary notice of the results he has already obtained. The difficulties he has to contend with are here greater than they were in the case of sheep-pox, for he cannot obtain specimens at every stage of the disease, and the earliest one he has examined was taken from a patient who died on the seventh day after the occurrence of headache. His observations show that a vigorous absorption of peculiar organisms, which are really fungi, takes place in the intestine over and around Peyer's patches, and that these pass into the lymphatics and veins of the mucous membrane. These organisms appear under two forms. The first class consists of roundish bodies of a greenish-brown colour and varying size, some of them being two or three times the size of a coloured human blood-corpuscle, while others are only one half or one quarter the size. They generally lie together in thick masses of a dark olive-green colour, but whenever they are sufficiently apart from one another to allow of accurate observation (*e.g.* at the margins of masses), numbers of them are found to be undergoing division, so that they present a kidney or dumb-bell shape. The second class consists of micrococci. Micrococci are small vegetable organisms which are from $\frac{1}{20000}$ to $\frac{1}{25000}$ of an inch in diameter, and under a low power appear like little dots, but under a high power appear as globular bodies. Each of these consists of protoplasm enclosed in a membrane of cellulose which resists the action of caustic potash. They sometimes appear isolated, but frequently they are found united together by an intercellular substance in twos, in necklaces, or in masses, or zoogloœa, as they are termed.

Although all that we can as yet positively assert with regard to the relation of these fungi to the intestinal lesions in typhoid fever is that they occur together, and we cannot say that it has been conclusively proved that the fungus is the cause of the lesions, yet it is so exceedingly probable that we may accept it, at least

provisionally, as proven, and consider what bearing this new pathology will have upon treatment. Of course, if we are to cut short the disease, we must remove the cause, *i.e.*, we must destroy the fungi. But every one who has attempted to treat skin diseases dependent on the presence of parasitic fungi knows how difficult it is to destroy these organisms, even when they are lying superficially among the cells of the epidermis, exposed to the action of the powerful remedies, or poisons, we might say, which are used for their destruction.

The difficulty is immensely increased when they are no longer confined to the surface as in cases of tinea, but penetrate into the blood-vessels and lymphatics of the true skin, as in sheep- and small-pox; and the case appears to be hopeless when they infiltrate the tissues of the intestine, as they do in typhoid fever. For it seems scarcely probable that we shall find a remedy which will destroy these fungi, protected as they are by a membrane which will resist even liquor potassæ, without, at the same time, destroying the unprotected cells of the mucous membrane itself when applied to it. Still less probable does it seem that we shall find one which, when introduced into the blood and carried by it to the fungi, shall destroy them, without at the same time doing irreparable damage to the delicate cells of the brain and other vital centres, and thus curing the disease only by slaying the patient. Ought we not, then, to direct our utmost energies to the task of preventing the entrance of these deadly fungus germs into the organism, and thus prevent the disease which we can so litle hope to cure?—*Practitioner, Jan.* 7, 1875, *p.* 5.

5.—ON THE TREATMENT OF THE DIARRHŒA OF TYPHOID FEVER.

By Dr. George Johnson, F.R.S., Senior Physician to King's College Hospital.

[The treatment of the diarrhœa forms a very important part of the management of typhoid fever, as, in the great majority of cases, the severity and danger of the disease are in direct proportion to the intensity and duration of the diarrhœa. The common practice at King's College Hospital was to give an enema containing from 10 to 20 drops of laudanum after each liquid stool. This plan, however, which was that strongly advocated by Dr. Todd, did not prove at all satisfactory.]

For a number of years we have entirely changed our treatment, and I have gradually arrived at the conclusion that in the treatment of typhoid fever careful nursing and feeding are

of primary importance, while, as a rule, no medicines of any kind are required, and when not required they are often worse than useless. The result of this change of treatment has been that diarrhœa is a less frequent symptom than formerly, and when it does occur it is far more tractable, while tympanitic distension of the abdomen is a rare event. The mischievous opiate enemata and the torturing turpentine stupes have disappeared together. I believe that one of the main reasons why we have less diarrhœa than formerly is, that we carefully abstain from the employment of irritating drugs of all kinds. As a rule, a fever patient has the "yellow mixture," which is simply coloured water; and except an occasional dose of chloral to procure sleep, and a tonic during convalescence, we give no active medicines of any kind. We feed these patients mainly with milk, with the addition of beef-tea and two raw eggs in the twenty-four hours, and we give wine or brandy in quantities varying according to the urgency of the symptoms of exhaustion, especially in the advanced stages of the disease; but in many of the milder cases, and especially in the case of children, we find that no alcoholic stimulants are required from the beginning to the end of the fever, and when not required they are of course best withheld. I have said that we give no irritating drugs of any kind. For a time I adopted the practice which has been strongly recommended, of giving repeated doses of diluted mineral acids. I have long since abandoned this practice, for I am sure that it was injurious, and it was injurious in a very obvious and intelligible way: it irritated the ulcerated mucous membrane of the intestines, it caused pain and griping, and I believe that it often increased the diarrhœa. I have no doubt that the comparative infrequency of severe and obstinate diarrhœa amongst my enteric fever patients during the last few years is partly attributable to the discontinuance of this mineral acid treatment. The extreme sensitiveness of the intestinal mucous membrane during the progress of typhoid fever is obvious and indisputable. It is admitted on all hands that the greatest care is required in returning to solid food during convalescence; a want of caution in this respect has often been followed by a return of pain and diarrhœa, an increase of temperature, and not seldom by a decided relapse. If, then, a slice of bread or a morsel of fish can excite such local and general disturbance even after the subsidence of the fever, how improbable is it that repeated doses of an irritating mineral acid can be given without injury during the height of the fever, when the ulceration of the intestines is actively progressing!

One more hint I wish to give you with regard to the diarrhœa of typhoid fever, which is, that in all probability it

is often increased by the patient's inability to digest the beef-tea and eggs which are sometimes too abundantly given. When you have reason to suspect that this may be the case, I advise you for a few days to keep the patient entirely upon milk, which contains all the elements required for the nutrition of the tissues in a form most easy of digestion. I have had a large experience of the effects of an exclusively milk diet in various forms of disease. In many cases of Bright's disease it is very efficacious, but one of the inconveniences in some of these cases is its tendency to cause troublesome constipation. In many cases of chronic diarrhœa and dysentery, milk diet will effect a cure without the aid of medicines of any kind. There is now in Twining ward a girl, aged 14, who for four months had been suffering from dysenteric diarrhœa, the stools containing much blood and mucus. She was put upon a diet of milk alone, without medicine: within a fortnight the diarrhœa entirely ceased, and she is now convalescent. For the reason, then, that milk has this antilaxative and even constipating effect in various morbid states, it is, when given alone, one of the best antidotes for the diarrhœa of typhoid fever.—*Practitioner, Jan.* 1875, *p.* 1.

6.—ACTION OF DIGITALIS IN THE EVOLUTION OF TYPHOID FEVER.

Dr. Bernheim, Professor Agrégé at the Faculty of Medicine at Nancy, publishes, in the Memoirs of the *Société de Médecine de Nancy* for 1873, his conclusions on this subject. They are as follows:—1. The thermometric evolution of typhoid fever is comprehended in the following formula, initial period from three to five days. Period of actual disease from one to two weeks, period of decline from six to eight days. In serious cases, a second irregular period commences about the middle of the third week. 2. Digitalis, when administered in typhoid fever, always produces lowering of the temperature; either complete defervescence or remission. 3. The first effect of digitalis on the temperature shows itself two days after administration, the lowest temperature is obtained on the following day, sometimes only on the fourth day after its administration. 4. The lowering is generally progressive; sometimes it terminates by a more rapid fall. In some cases, there is a very rapid fall in the interval between two thermometric observations, from the evening to the morning, or from the morning to the evening. 5. During the action of the digitalis, the temperature may rise again in the evening, often it is equal, or inferior to that of the morning. Defervescence, or the greatest remission, may occur in the evening. 6. This

defervescence, or greatest remission, lasts from a few hours to three days, the temperature then rises. In about two-thirds of the cases, it no longer rises to the same height as before the administration of the digitalis. 7. The action of digitalis on the thermometric evolution of typhoid fever may be thus expressed, the temperature is lowered. Taking into account the descent, the minimum, and the reascent, it may be said that the duration of the influence on the temperature varies from three to twelve days, the average being seven days. In two-thirds of the cases, the thermometer never reaches the original point. 8. The pulse generally falls gradually with the temperature; the temperature rarely falls before the pulse, or the pulse before the temperature. 9. It is very rarely that either the pulse or the temperature is alone influenced. 10. The pulse and the temperature fall together, but not in a parallel manner. Sometimes the pulse is lowered at night whilst the temperature still undergoes the evening exacerbation. 11. After the reascent of the temperature, the pulse generally remains low; it may even slacken still more, and attain its minimum several days later, even remaining slow during three weeks. 12. The lowering of the pulse varies from thirty to sixty pulsations. In the greater number of cases it falls below the normal. 13. The sphygmographic tracings undergo modifications through digitalis. Dicrotism between two pulsations appears on the line of descent. It rises again on that line. The pulse first becomes irregular, often reduplicate; then the line of descent becomes longer and more oblique, and tends to show a convexity above. These characteristics are explained by increase of tension and arterial tonicity. 14. Digitalis has never produced any unpleasant action on the nervous system nor on the digestive canal. The delirium often ceases or diminishes with the decrease of heat, and respiration is calmer. The intestinal hemorrhage pointed out by Ferber as being probably produced dy digitalis, does not appear in any case to have been due to this medicament. 15. The fever may evolve itself with a slackened pulse. The acceleration of the heart's action is not necessary to fever, it is a secondary phenomenon which appears to be due to the augmentation of the heat itself, In the tracings of pulse and temperature taken about the beginning of an attack of fever, the thermometric tracing rises before that of the pulse. 16. The slackening of the pulse obtained by digitalis, is not the cause of the lowering of the temperature. 17. The physiological mechanism of the antipyretic action of digitalis is not explained. This action is at least partially independent of the heart and of the modifications of the arterial tension. Digitalis does not seem to act directly on organic combustion. A nerve-poison and not a blood-poison,

it appears to act on the nervous system, the regulator of the animal temperature. an apparatus which, on one side, directs the waste of caloric notably by the vaso-motor nerves, and which, on the other hand, regulated the production of caloric by special ways, yet unknown, but admitted by most physiologists.—*British Medical Journal, March* 27, 1875, *p.* 416.

7.—ON THE ALLEGED SUCCESSFUL TREATMENT OF TYPHOID FEVER BY "COLD."

By Dr. Frederick T. Roberts, Assistant Physician and Teacher of Clinical Medicine at University College Hospital, &c.

It is in the treatment of cases attended with very high temperature—cases of hyperpyrexia—that the beneficial results of applying cold to the surface, by means of baths, &c., have been most signally obtained; and here it may be said without any exaggeration to have saved the lives of patients who must inevitably have died had not this method of treatment been adopted.

Several German physicians have spoken highly of the treatment of ordinary cases of various fevers, and among them of typhoid fever, to which disease I desire now to call attention more particularly. In a paper on typhoid fever in the recent volume of the St. Bartholomew's Hospital Reports, Dr. Gee considers the use of external cold in its treatment, but apparently rather from a hypothetical point of view than from any actual experience of its advantages. He implies that, if employed at an early period, during the primary fever, it might control the local intestinal lesion, by limiting the number of follicles involved; while in a more advanced stage it might be useful in reducing the secondary fever which accompanies the morbid changes in their progress.

The conclusions of those observers who have practically tested this method of treatment deserve our thoughtful attention, and it is important to ascertain what they affirm respecting it. None of those who are reliable pretend that they can actually *cure* typhoid fever, either in the sense of checking the disease at the outset, or even of shortening its course. To talk of *curing* or *arresting* this complaint shows a want of knowledge as to its nature. At the best, we can only guide it in its progress, and endeavour to bring the patient successfully through the dangers which he has to encounter. This remark applies not only to the treatment now under consideration, but

to any other which claims an influence of this kind over typhoid. Some believe that the convalescence is more rapid after the treatment by cold; but others deny this. So also is there a difference of opinion as to whether it affects the more prominent symptoms, such as diarrhœa, tympanitis, intestinal hemorrhage, &c.; some asserting that these are beneficially influenced, others that they are not. All seem to agree that it does not increase the tendency to lung-inflammations, or aggravate these if they already exist. The most important statement made is, that this method of treatment has greatly reduced the mortality from typhoid fever, particularly when the cases have been treated from an early period. Certainly the returns made show a great difference in this respect, when the past is compared with the present, and seems to indicate a highly satisfactory result. At the same time, before any certain conclusion can be arrived at, a large number of cases ought to be taken into consideration; for it often happens that a series come under treatment which are of a mild type, and the mortality may present a very low percentage, whatever treatment may have been adopted; while some epidemics are very fatal. Judging from personal experience, and combining hospital with private practice, I believe that the rate of mortality has not been higher in the cases which have come under my own notice than it is represented in the German returns. The mortality in former times was decidedly high, and it would be well to know what modes of treatment were then adopted, as they were not always of a harmless character in days gone by, while the diet and hygienic conditions—most important elements in the treatment of typhoid—were not attended to then as they are now.

Those who adopt this plan of treatment are anything but agreed as to the details of carrying it out. The principal methods employed are frequent cold or tepid sponging of the skin, wet-packing, cold baths, affusion, and tepid baths gradually cooled. Some pursue the treatment vigorously in all cases; others only when the temperature reaches a certain height. There are also differences as regards the duration of each application, the frequency of their repetition, and the length of time during which they are continued.

I venture to state briefly the conclusions which I have arrived at with respect to the treatment now under consideration.

1. It is highly desirable that the members of our profession should be more generally impressed than they are at present, with the usefulness of the various modes of applying cold to the surface of the body in febrile cases, under certain circumstances; and that they should be prepared without

hesitation to carry one or other of them out efficiently whenever this plan of treatment is indicated. This applies to typhoid in common with other fevers.

2. On the other hand, to adopt a routine hydropathic treatment of any fever seems to me most objectionable, and this applies especially to the more severe methods which are advocated. As already remarked, they are not easily carried out in general practice; they are certainly not required in a large proportion of cases; most of them are anything but pleasant to the patients, and they may prove very trying and exhausting, especially if frequently repeated, as they usually need to be if the treatment is efficiently fulfilled; while it must be remembered that they are not harmless measures, but may have a powerful influence for evil as well as for good. With regard to typhoid, many cases do not come under observation until it is too late to attempt to check the primary fever, even supposing that the intestinal lesion could be thus limited. For these and other reasons I do not see that, at present at least, a hydropathic treatment of typhoid fever in general practice has any claim to our support. If it is thought worthy of trial, it ought first to be fairly tested in *bonâ-fide* cases of this disease, and under the strictest and most competent supervision. With regard to sponging of the skin, I believe that this is often very useful, and ought to be employed far more frequently than it is at present, in typhoid as well as in other fevers. With proper care it does no harm, while it often gives much relief, and is beneficial in other respects.

3. The cases in which the more severe methods of applying cold are indicated are those in which the temperature is already very high and remains so, or shows a tendency to rise rapidly, especially if at the same time there are signs of much nervous disturbance. Unquestionably this plan of treatment is not resorted to under these circumstances nearly so frequently as it ought to be. It is difficult to lay down any exact rule as to what temperature indicates the necessity for adopting it, but if it reaches to 106° F. and shows no tendency to fall, or, still more, if it continues to rise, this treatment deserves due, consideration. Necessarily much will depend on the actual condition of the patient, and every case must be thoroughly considered in all its features. The best method seems to me decidedly that of placing the patient in a tepid bath, and gradually cooling this. Affusion over the head is useful if there are marked nervous symptoms. Of course it is imperative that this treatment should be always conducted under the strictest supervision, and its effects carefully watched.—*Practitioner, Jan.* 1875, *p.* 12.

8.—ON THE COLD WATER AND ANTISEPTIC TREATMENT OF TYPHOID FEVER.

By Dr. Henry Blanc, Surgeon-Major H.M. Indian Army.

[In typhoid fever, as in other zymotic diseases, the employment of cold and of antiseptics is theoretically indicated, seeing that an elevated temperature favours the development of the contagious matter, upon the growth of which it and they depend.]

Dr. Brand's (of Stettin) treatment of typhoid fever is based on the theory of fermentation. His method, however, is equally acceptable if we believe in the germ theory of disease, as most agents that arrest fermentation will hinder the growth and development of such low organisms as minute portions of bioplasm. Dr. Brand endeavours to maintain the temperature of the body below fever heat. His *modus operandi* (as described by Dr. Glénard, of Lyons, who during his captivity at Stettin, witnessed ninety-three cases of typhoid fever treated by Dr. Brand himself) is the following :—

At the beginning of the disease—end of the first or beginning of the second week—the patient is placed up to his neck in a bath at the temperature of 68° F., and at once cold water —43° to 47° F.—is poured over his head; an important point, specially when cerebral symptoms are present. The following days, when doubtless the nervous system will be less excited, water at the temperature of the bath will suffice for the douche. The douche should be continued during a couple of minutes; the assistant will afterwards rub and shampoo under the water the limbs of the patient during some three or four minutes; the patient is then to be left quiet. By that time a transformation can already be observed in him. He was, perhaps, unconscious when placed in the bath; he now begins to complain, the tongue gets moist, the face assumes a more natural appearance, and the previous drowsy, stupid look gives way to an expression of astonishment and fear. After the patient has been some eight minutes in the bath, he is seized with a violent rigor; the teeth chatter, he pants for breath, and violent and repeated fits of coughing are followed by the expectoration of thick bronchial mucus. Frequently there is an involuntary stool. The patient by this time feels anxious, and endeavours to get out of the bath, but the physician must here more than ever remember Dr. Brand's aphorism: "The patient will shiver and chatter his teeth, but he must remain fifteen minutes in the bath." If the rigor appears early, the bath should last only fifteen minutes, and somewhat longer should the shivering

appear later. Before removing the patient from the bath, the head-douche should be repeated.

Taken out of the bath the patient can stand supported by the assistant. He is trembling with cold, his skin marbled, shaking like a leaf beaten by a strong wind. He is at once carried to his bed, and his shirt should be put on without previously wiping him. A woollen blanket has been prepared to wrap up his feet, the mattress and pillow should be sufficiently hard as not to be depressed by the weight of the body. A single sheet should be thrown over him in summer, a light blanket in winter. Next a cupful of tepid broth should be given to him, followed by a mouthful of good old wine. He is then to be left perfectly quiet. The shivering will last from twenty minutes to nearly an hour.

The cold baths are repeated about every third hour, day and night, until the temperature in the rectum measures only 101° Fahr. The patient's diet should be served tepid, and consist of milk, tea and milk, mutton and beef broth. Every half-hour he should drink a mouthful of iced water, and where much prostration is present he should be allowed a little good wine before each bath. Cold-water enemas are also administered in some cases.

Dr. Brand applies his method to all cases, and during all the stages of the disease; he admits but one exception—perforation of the bowel, a condition which requires perfect rest.

Such is Dr. Brand's method, and the results obtained by it are excellent.

Dr. Béhier, Professor of Medicine at the Hôtel Dieu, Paris, has given Dr. Brand's method a fair trial, and from what he has observed he concludes that under the influence of the cold baths the respiration is easier and more regular, the heart contracts with more vigour, the secretions reappear, the tongue gets cleaner, and the thirst and meteorism lessen.

Dr. Glénard's opinion is the following:—"You will not find in the five or six thousand cases of typhoid fever treated by this method one single unsuccess among those which have been submitted to it since the beginning of the disease."

Up to 1868 Dr. Brand had treated 170 patients by cold baths, and obtained 170 cures; and in the year 1870-71 he had 89 cases and 89 cures. Dr. Glénard records 52 cases and 52 cures; and Dr. Huchard states that all the physicians who have carefully followed Dr. Bland's method have mostly successes to register.

The following table of Wunderlich (quoted by Dr. Huchard) gives the general results of Brand's method compared with other systems of treatment:—

Name of author.	Mortality in typhoid fever.	Mortality in typhoid fever where Brand's method has been applied.
Wunderlich	18·1	7·2
Jurgunsen	30·2	7·5
Liebermeister and Hagenbach	26·2	9·7
Rugel	20	4·3
Stöhr	20·7	6·6

To ensure success Brand's method should be rigorously applied from the beginning of the disease; sometimes the treatment will require from 50 to 200 cold baths. If the treatment be begun only when the pyrexia has reached its height or at an advanced stage of the disease, then the results are far less favourable. The duration of the disease is not lessened by this treatment; convalescence does not begin before the twenty-first day; it is, however, shorter and easier, free from accidents beyond an abundant crop of boils. Bedsores are always avoided (Huchard).

A priori, it would seem that we could desire nothing better than the cold-water treatment, and that Dr. Brand is correct when he declares that, in future, classical authors will be able to omit the chapters on the prognosis and on the complications of typhoid fever. I believe, however, that we can do better still if we unite with the cold-water treatment the internal administration of antiseptics; then, not only will all complication be equally absent and the prognosis still highly favourable, but, what is of no small consequence, the duration of the disease will be shortened, whilst the patient will be spared the inconvenience—to use a very mild expression—of a considerable number of cold baths.

Dr. Brand and his followers limit their treatment to the action of cold: cold baths, cold drinks, cold enemas. A low temperature, it is true, arrests the development of organic matter; but other agents are endowed with the same power even to a higher degree. We should not lose sight of the fact, proclaimed by Brand himself, that the cold-water cure only succeeds when employed from the first appearance of the disease—before, consequently, the development and growth of the morbid germs. After the disease has made some progress, the action of cold is limited to the abstraction of abnormal heat—a point we should by no means overlook or

undervalue; but the organic poison has already produced considerable mischief, and the issue of the case is not favourable.

If, however, whilst we avail ourselves of the advantages we obtain from the employment of cold we administer at the same time internally substances which arrest the growth or destroy the vitality of morbid germs, we shall then not only force the disease to run a favourable course, but also considerably shorten its duration.

I have examined the action of cold alone in the treatment of typhoid fever, and, before speaking of the combined action of cold and antiseptics, I will say a few words on the employment of these substances, unaided by the influence of a low temperature.

Niemeyer states: "After the accurate observations of Wunderlich we can scarcely doubt that by this remedy (calomel) we may in some few cases cut short the disease (according to Wunderlich one or two five-grain doses are enough), and that in the great majority of cases where this remedy is given during the first week, and before the occurrence of much diarrhœa, the course of the disease is rendered *milder* and *shorter*. The experience of Pfenffer's clinic, as well as my own, perfectly agrees with Wunderlich.....Willebrand has lately recommended iodine as a specific in typhoid, and the results published by him, Liebermeister, and others, urge us to make more trials with the preparations of iodine in this disease, although the treatment is not a new one.....It is said that even after one, two, or three days of this treatment there is a decided remission in the temperature, sordes do not come on the gums, or they disappear early; the fever ceases in an *unusually short time*."

The subchloride of mercury and iodine are both powerful antiseptics. In typhoid fever this property of theirs can alone account for their special action, and for the early subsidence of the disease. Other antiseptics, such as the sulphate of quinine, dilute sulphuric acid, the chloride of aluminium, &c., find a suitable employment in typhoid fever, as they combine antiseptic and tonic properties. But if, instead of making use of one method only, we employ both at the same time—each of these treatments being good individually—united the result must be still more favourable. In fact, it is so, and when in practice we apply these rational views, we find that typhoid fever is the most manageable of diseases.

I beg to be allowed a short digression from my present subject, in order to illustrate the great clinical value of the combined cold and antiseptic method of treatment of another specific disease—malarious remittent fevers. In typhoid fever

it is often difficult, when the disease has been cut short, to impress upon others our conviction that we had to deal with a true case of typhoid. Malarious fevers are not open to this objection, and for that reason I will give the result obtained in them by this treatment.

During the Chinese War of 1860-61 I was for a time in medical charge of a battery of Royal Artillery and of a company of Royal Engineers. Remittent and continued malarious fevers of the worst type raged in the camps. The treatment I put in use consisted in the external application of cold (cold-water packing) and the internal use of antiseptics—namely, alcohol, quinine, dilute sulphuric acid, &c. I did not lose a single patient, whilst all around me death was daily carrying away many victims. Again, in India the same treatment was always successful in my hands. Among the severest cases that I remember was that of a young English lady, who, forty-eight hours after her confinement, was stricken down by remittent fever of the comatose type. When I first saw her, on the fourth day of the disease, I found her lying in a dying state in the town of Gogo (a half European town situate on the shore of the Gulf of Cambay), where she had been sent some weeks previously for the health of her eldest child. The thermometrical range had in her case reached a height hardly compatible with life—between 109° and 110° F. Sheets dipped into cold water were immediately wrapped around her, and the temperature of the wet sheets kept low by means of constant ventilation; quinine and brandy were administered frequently and in very large doses. During twenty-four hours the struggle between life and death went on, but she came out victorious, and before many days entered on full convalescence.

In typhoid fever the combined treatment gives the same favourable result; I will refrain from mentioning a few cases where I fully believe the disease was cut short by this method, as the pathognomonic signs had not time to develop themselves, and my conviction might not be shared by others. Fortunately the following case can give rise to no objection concerning the real nature of the disease; pulse, temperature, rose spots, bronchial râles, &c., all proclaim it to be a case of typhoid fever.

On the 8th of April last I was called upon to attend a Mr. P——, an American gentleman staying at the Grand Hotel, Paris. For four or five days he had considerable fever, had kept to his room, but had not taken any medicine beyond a few aperient pills. Previous to his keeping to his room, for some weeks he had felt out of sorts; he had suffered from headache, lassitude, loss of appetite, erratic pains in the limbs, restlessness

at night. I found him in the following condition: skin warm, pulse frequent, tongue coated in the centre, the point and margin red and dryish; slight cough; sibilant and a few moist râles; increased dulness in splenic region; no gurgling in iliac fossa, but great tenderness on pressure; stools somewhat frequent, loose and scantity; urine high-coloured; fæces pale; no head symptoms beyond a feeling of lassitude and drowsiness. I prescribed five grains of calomel at bed time, and an effervescing draught.

April 9th. About the same; skin warm and dry; pulse frequent, compressible; two semi-liquid motions since yesterday; much tenderness in right iliac fossa; cough not very troublesome; expectoration of some thick mucus; a few moist and sibilant râles posteriorly; splenic dulness well marked; about a dozen rose spots on abdomen and chest. Ordered two baths at 77° Fahr. Iodine, six grains; iodide of potassium, twelve grains; water, one drachm: five drops in a wineglassful of water every third hour. Sulphuric-acid lemonade; fresh milk taken cold; ice, soup, two ounces of brandy in the day with ice and Vals water.

10th. Complains of pain in the splenic region; the liver is somewhat tender on percussion, and its normal dulness increased; sibilant rhonchi heard in both lungs posteriorly; much tenderness and slight gurgling in right iliac fossa; urine scanty and high-coloured; stools scanty, semi-liquid; tongue in the centre covered with a brownish fur; another eruption of rose spots is seen this morning; the first eruption is still well marked; pulse frequent; skin warm. Continue drops and mineral lemonade. Four grains of quinine to be taken in two doses in the morning. Two baths at 68° F. Diet as above.

15th. Case progressing favourably. Since the 12th no further eruption of rose spots; no diarrhœa; slight meteorism; no head symptoms; rests well at night; appetite good; asks for more food. Omit cold baths; continue treatment; early nent morning to take a tumbler of Freidrichshalle bitter water. Diet: rice pudding, soup with vermicelli, cold milk, and two ounces of brandy.

17th. Improving greatly. Omit iodine drops and mineral lemonade. Diet: fish, soft-boiled eggs, soup, &c.; a glass of good Burgundy wine at meals.

20th. Sat up part of the day. No frequency of pulse or heat of skin; urine clear, abundant; appetite good; tongue cleaning; feels somewhat weak, otherwise is quite well. Omit quinine. Ordered tincture of nux vomica, dilute nitric acid, of each eight drops in a wineglassful of water, before meals; a tablespoonful of wine of phosphate of lime after meals. Diet:

chicken for breakfast, lamb cutlets for dinner, Burgundy wine.

24th.—Quite well; took a drive yesterday; gaining strength rapidly.

Instead of lasting twenty-one days, as typhoid fever does where Brand's treatment is alone employed, here, under the combined influence of cold and antiseptics, both temperature and pulse fell on the fourteenth day. The convalescence was exceedingly short, and the recovery both good and complete.—*Lancet*, *Jan.* 23 *and Feb.* 6, 1875, *pp.* 122, 190.

9.—THE WET SHEET IN SCARLATINA.

By John Taylor, Esq., Liverpool.

As the present high rate of mortality from epidemic scarlatina may justify practical suggestions prompted by experience, I feel it my duty to endeavour to excite the profession to a reconsideration of the remedial powers of the wet sheet as an auxiliary in promoting cutaneous elimination.

Though all agree as to the importance of promoting and sustaining cutaneous elimination in the prevention of cerebral, spinal, and other congestions, and, at a later stage, the disintegration of mucous membranes, dropsy, and glandular enlargements, yet this simple, powerful, and ready-at-hand auxiliary is unappreciated. Forty years' experience has assured me that this plain or medicated vapour-giving envelope affords the best *external* means for eliminating scarlatinal poison and preventing destructive sequelæ. It promptly suppresses pyrexial heat and itching; produces sleep, with a soft secretive skin, more or less continuously; and enables the digestive organs to accomplish that great desideratum in the treatment of scarlatina—viz., absorption of highly nutritious food. It may be repeated, on the recurrence of the febrile paroxysm, two, three, or four times in twenty-four hours, the patient remaining enveloped from half an hour to an hour. Mothers and nurses who have witnessed its efficacy are most earnest in its repetition. My plan of procedure is to immerse a nightgown, slit up at the front, in hot water (half a pint to a pint), pure, or medicated with a drachm or two drachms of tincture of capsicum, or in the infusion of three or four pods; or in mustard-water, the clear supernatant fluid from a tablespoonful of mustard to a pint of water; extending the gown over the feet by means of a towel immersed in the same fluid, both to be well wrung out and suddenly applied, and the patient quickly packed in two blankets previously placed on the adjoining sofa or bed; another blanket, or two pillows, or an eider-down quilt covering all.

The medicated packing is preferable in the incipiency, and at any other time to evoke the rash, and in cases of cerebral

oppression, with pale skin, low pulse, and delirium. Last month I had a case of this type, in which the mustard packing was applied. It did not elicit the rash, but it cured the delirium, raised an alarmingly depressed pulse, and restored the excretions. This effect was solely dependent on the medicated packing, as the patient, a girl of thirteen, could not swallow medicine or food, and enemata had not then been administered. With the aid of a tonic she made the best recovery of three in the same family, and had no sequelæ.

The auxiliary mode of treatment here defined is by no means intended to exclude the ordinary plan which every practitioner's experience has led him to select and rely upon; but I am of opinion that if packing is judiciously incorporated with such reliable treatment, it will be the means of saving many lives that would otherwise be lost, and of diminishing the severity and duration of the sequelæ.

I further believe that in other cases of blood-poisoning the exhibition of medicaments cutaneously by vapour would in some degree neutralise the poison, aid its elimination, and, as in packing, soothe the whole nervous system. During a cholera epidemic in Liverpool I had part charge of a district where nearly all who first went into the hospital died. One woman, with cholera in the malignant form, was packed in a wet sheet with half a pound of mustard, and remained enclosed six hours, notwithstanding her imploring entreaties to be released. She drank copiously of iced water. The vomiting, purging, and cramps began to abate in two hours, and had ceased when she was unwrapped, presenting the ordinary lobster change from blue to red. Gastric fever, with great thirst, ensued for several days, when she recovered as a brand plucked from the burning.

Modern parliamentary mustard, deprived of capsicum and other adjuvantia which made it formerly a condiment so famous, would not have answered the purpose. Doubtless, *persevering cutaneous elimination* is a great medical power.

Not only as an eliminator may the wet medicated envelope be used, but as an antispasmodic in the relief of pain and irritation in any of the membranes, mucous, submucous, or serous; with the aid of chloral, morphia, conium, belladonna, nux vomica, &c., dissolved in the water, or sprinkled on any particular part of the wet sheet. It has the merit of antiquity from the ancient Romans, and among the farmers of Great Britain for the relief of colic and the inflammatory diseases of cattle. A sheet, wet with some herb decoction, or water sprinkled with turpentine, was thrown over the suffering animal,, and enveloped by blankets, quilts, and overcoats, snatched from the beds on which "the rude forefathers of the hamlet slept." And,

doubtless, many a pang was thus allayed and many a life preserved. Modern experience has witnessed the amazing relief procurable from the wet sheet, in its simple form, in pyrexial and glandular disorders, and from the medicated form in the zymotic and spasmodic affections. In stridulous croup, for instance, I have seen the mustard sheet act magically after other means more orthodox had failed. Its power is also potential in diphtheria simulating croup, and, in strong doses, in inflammatory croup, sometimes averting the impending tracheotomy knife.

The suggestion to use this auxiliary plan of treatment should not be slighted because of its antiquity or of its having been used empirically. Many blessings, moral and physical, have fallen into desuetude, and require revivals to awaken a consciousness of their existence and utility; and this is one of them, lying neglected within our reach. Objection would be rational if the more primitive plan of enveloping the suffering man or beast within the skin of a newly killed animal were recommended; but when one so simple and close at hand, so easily adapted, so soothing, and so powerful as an auxiliary in the routine of medical treatment, is recommended, suffering humanity should have the benefit of it, especially where no self-interest prompts the recommendation—except the satisfaction of doing good by presenting the cup of cold water so typical of charity.—*Lancet, Nov.* 14, 1874, *p.* 692.

10.—ON CERTAIN POINTS RELATING TO THE ETIOLOGY, PATHOLOGY, AND TREATMENT OF DIPHTHERIA.

By Dr. George Johnson, F.R.S., Professor of Medicine in King's College, Senior Physician to King's College Hospital.

[Diphtheria, though not highly contagious, is doubtless communicable from the sick to the healthy, and it appears highly probable that it may be originated *de novo* by filthy emanations from sewers and cesspools.]

In proof of the contagiousness of diphtheria, the following, amongst a multitude of similar cases, may be set forth.

M. Valleix, a colleague of Trousseau, while examining the throat of a patient, received into his mouth a small quantity of saliva spurted out by the patient in coughing. Next day, on one of his tonsils there was a pellicular deposit, and some hours later both tonsils and the uvula were covered by false membrane; the disease made rapid progress, and in forty-eight hours he died. Another of Trousseau's provincial colleagues was performing tracheotomy in a case of diphtheritic croup,

when he applied his mouth to the wound to suck blood from the trachea. He thus inoculated himself, and died in forty-eight hours.

Sir William Jenner states that Dr. E—— lived in Euston Road. He was attending a child ill from diphtheria, when he sickened with the same disease. As he recovered his attendant was attacked with it. No one in his house suffered except Dr. E—— and the young woman who was in constant attendance upon him. The child from whom Dr. E—— appeared to have caught the disease resided some distance from Euston Road.

Mr. Simon's second report to the Privy Council contains the following piece of evidence:—"No case (says Mr. Eastes) of diphtheria had ever been seen in Folkestone during my time, until Isabella W——, aged four and three quarter years, arrived from Boulogne on the evening of July 2nd, 1856, being then in an advanced stage of the disease. She died on the following day. On July 6th, Catherine W——, her sister, aged ten, was attacked. But she had never been in France; she had always resided on the East Cliff, Folkestone, in the same house to which her dying sister was brought four days previously. One other case occurred in the same house three days after, and they all terminated fatally."

In the same report Dr. Rumsey, of Cheltenham, states that "a schoolboy convalescing from diphtheria contracted by him at Swansea, where it was epidemic, and arriving at home in an open healthy suburb of Cheltenham, where at the time there was no diphtheria, was received and embraced by one of his two sisters. On the fourteenth day afterwards she was attacked by diphtheria, and suffered severely. Her sister, who did not meet her brother, helped to nurse her, and was attacked fourteen days after the first sister by the same specific disease."

Trousseau gives a case of direct inoculation of the mother's nipple by a diphtheritic sucking infant. The nipple became covered by false membrane, but the disease was arrested by appropriate treatment.

I have to thank Dr. Dewes, of Coventry, for the following brief statement of very instructive facts:—The younger of two brothers, a boy named Arthur, was taken ill at home with scarlet fever on the 8th of November. As his mother was expecting her confinement he was sent to a cottage on the outskirts of the town, where he had a severe attack, with a copious eruption and diphtheritic exudation on his fauces, but not in his larynx. Meanwhile the elder brother, Alfred, was taken ill at school on the 16th of November. Both boys had attended the same day-school; and at the same time some of the other boys were ill at home with scarlet fever. As the schoolmistress was a relation of the boys, it was arranged that the school

should be dispersed and the boy nursed there. He had scarlatina anginosa, but no diphtheritic exudation, and he became convalescent about the 25th of November. On the 5th of December the man at whose cottage Arthur was staying sickened with scarlet fever, and he, like the boy, had also a diptheritic throat. It now became necessary to remove the boy from the cottage, which was done on Dec. 6th or 7th. As the two brothers had been convalescent for a fortnight they were both allowed to occupy the same room at the school-house, and, although separate beds were provided for them, they soon got into the same bed. They were not allowed to leave the bed, and all went on well until the 18th of Dec., when Alfred was observed to have a croupy cough, with bronchial râles throughout the chest. On the following day he was much worse, the croup and the bronchitis hourly increased in severity, there was a diphtheritic exudation on the tonsils and uvula, and he died on the third day from the onset of the croupy symptoms. In neither case was the urine albuminous at any period of the illness. The most probable explanation of these facts appears to be that at the cottage where the first boy, Arthur, was nursed there was some sanitary defect which caused the scarlet fever to be complicated with diphtheria. The result of bringing the two boys together was that Alfred caught a fatal diphtheria from his convalescent brother.

The following case came under my own personal observation. In May, 1867, a gentleman living in one of the largest houses in Westbourne Terrace was under my care for diphtheria. During his illness, a gentleman from the country, who was staying in the house, spent much time in the patient's room, and helped to nurse him. When the patient was convalescent his country friend sickened with what proved to be a severe attack of diphtheria, from which he recovered at his country house.

The following history I received from the father of the children referred to. About four years ago a girl, aged fifteen, was sent home to a large house in an open park in Hertfordshire, after having been ill for ten days at a school at Brighton. It was noticed that for some days after her arrival she had a discharge from the nostrils. As no warning was given that she had been suffering from an infectious disease, she was allowed to associate with her seven brothers and sisters. After she had been about a week at home, the schoolmistress wrote to say that she felt anxious to hear of her pupil, as there had been some cases of diphtheria at the school. In about another week a sister aged ten, and a brother aged four, were seized within a day or two of each other with symptoms of diphtheria, and in a few days they both died. The children were isolated as soon

as they sickened, and no other case occurred. In this case there can, I suppose, be no doubt that the young lady when she arrived at home was suffering from nasal diphtheria, and she thus became the vehicle of a fatal infection to her brother and sister.

I believe that all the cases which I have here cited are examples of the diphtheritic infection being conveyed either through the air or more directly by the actual contact of the morbid secretions with the tissues of the recipient.

To oppose to positive evidence of this kind such negative statements as that in numberless instances medical attendants and nurses have come into close contact with diphtheritic patients without taking the disease, appears to me a vain and frivolous objection. Diphtheria is not a highly contagious disease. In the scale of infectiousness it stands far below scarlet fever, for instance, and there is reason to believe that the susceptibility to the disease differs almost infinitely in different persons; but a medical attendant who entirely ignores the contagiousness of the malady is likely to neglect reasonable and necessary precautions to protect himself and others from the risk of infection.

When a case of diphtheria occurs in a house without evidence of importation from without, still more when several cases occur together or in quick succession, there will be good reason to suspect that sewers, cesspools, or contaminated water may be the source of the disease. My belief is that in a very large proportion of cases there is as close a relation between diphtheria and insanitary conditions as exists between typhoid fever and similar insanitary conditions; and I scarcely need say that if this be so the general recognition of the fact is of the greatest importance with reference to the adoption of preventive measures. There is reason to believe that much more harm would result from ignorance of the filth origin of diphtheria than from practically ignoring its infectiousness.

Many instances have come to my knowledge in which fetid fæcal emanations have appeared to be the direct cause of diphtheria. I will refer to a few of these.

The first cases of diphtheria that I remember to have seen occurred in the persons of two children of a village tradesman in Kent, in October, 1855. They were both taken ill simultaneously; one, a girl, aged nine and a half years, got laryngeal symptoms and died; her sister, aged six years, got a diphtheritic patch on one tonsil, and was quickly well. Another sister, aged seven, had died on the 1st May previously, after a week's illness, in which sickness, sore-throat, and a very offensive discharge from the nose were the chief symptoms. No other cases had occurred in the village up to this time. The house

stood by itself in a garden; there was no drainage. From what I have since seen of diphtheria, I have no doubt that the cause of the disease in these three children was the effluvium from a copious and most offensive fæculent accumulation beneath a common open privy in the garden, to which the whole household resorted.

In January, 1872, I saw with my friend Mr. Bateman, of Richmond, a lady, Mrs. B——, who was suffering from a diphtheritic throat. Mr. Bateman has kindly sent me the following note of the circumstances:—"The lady you saw with me at Ham was one of a family consisting of herself, her husband, four children, and three servants. The house is drained into a cesspool about twenty yards distant. The accumulation of many months was emptied one day while the wind was blowing towards the house from the cesspool, and a very offensive smell reached the house. Three days afterwards all the four children became feverish and complained of sore-throat; the tonsils were seen to be inflamed and covered with yellowish-white patches. In a few days two of the servants were attacked, one rather severely; and, lastly, Mrs. B——, the lady you saw with me. Her tonsils were inflamed and covered by false membrane. The only members of the family who escaped were Mr. B——, the husband, who was away from home all day, and one servant." All the patients recovered.

When Mr. Bateman wrote me the history which I have just read, he went on to say, "I have been called lately to a similar set of cases. The family consisted of the father and mother, seven children and three servants, On going up the garden to the house my nose was assailed by a horrible stink, and, seeing some men at work close to the house, I stopped to see what they were doing. I found that they had ripped open a drain running in front of the house within ten yards of it, and they had opened a cesspool into which the drain flowed. I found the mother, five of the children, and two of the servants suffering from sore-throat identical with the Ham cases." In the same letter he says, "I am at the present time (January, 1874) attending at another house where a young lady and the parlour-maid are suffering from severe sore-throat with the usual patches. A cesspool had been opened a few days before quite close to the house. I feel quite certain that all these cases were caused by the sewage filth, and in particular by that portion of it which, floating in the atmosphere, was respired by the persons affected."

I am indebted to my friend Dr. Casey, of Windsor, for the instructive particulars of a succession of cases of diphtheria in a family at the village of S——from Nov., 1872, to May, 1873. "The family consisted of father, mother, and nine children,

aged from twelve to one and a half. The house is detached, and out of the village. There were no cases in the immediate neighbourhood, though the disease occurs there with, I think, more than average frequency. During November, 1872, two of the children (Nos. 6 and 7) passed through attacks of diphtheria of moderate severity. A week or so after their seizure (Nov. 24th) their mother, who was nursing them, was attacked by the disease in an almost malignant form, and died on Dec. 1st. After some days the five elder children were sent away, and some steps were taken to repair drains and disinfect. Six weeks after (Jan. 15th, 1873) the baby and a servant fell ill, and the former died (Jan. 23rd). Then the three children remaining in the house (two of them convalescents) were sent away. The house was now most energetically disinfected, and drains examined. After the lapse of ten weeks all the children returned (April 9th). A week after their return their uncle visited them, slept in the house two nights (April 15th, 16th,—17th), and returned home on the evening of the 17th. During his journey home to Worcester he felt unwell, was worse, restless and sleepless during the night, next day decidedly ill, and on the morning after that (19th) a patch of diphtheria was recognised. The attack which followed was a mild one. Six days after the uncle's visit (April 22nd) the youngest child showed the disease. This child had remained in the infected house until the second outbreak (January), and had since that been away with the two convalescents. The children were again removed; Nos. 1 and 4 to one house, and the rest (Nos. 2, 3 and 5) to another. But of the latter, two more (Nos. 2 and 3) were attacked in a few days (April 25th) in succession; and more than a fortnight after removal from home, yet another child (No. 5) fell ill (May 11th). This was the last and tenth case, two only of the children (Nos. 1 and 4) having escaped. And now, at last, the foul remains of a disused cesspool were found under the floor of the drawing-room, which room, I may add, had from the first been suspected of bad smell. After that had been remedied all the family shortly returned, and have continued well. The last case must, seemingly, be ascribed to *personal* contagion, for it occurred after the child had been for more than a fortnight away from the original source of infection, and in a presumably healthy farmhouse. On the other hand, the uncle's attack was almost certainly owing to *endemic* infection, for the lapse of time (ten weeks) and the vigorous measures adopted to purify the house (which was, when he slept in it, still bare of carpets and papers) renders the supposition that contagious matter from the previous cases lingered in the house and furniture improbable."

It appears to me to be a matter of almost absolute certainty that the foul cesspool was the primary source of all these cases. It is possible, and not unlikely, that the mother may have caught the disease from the two children who were the first sufferers; and it is still more probable, as Dr. Casey suggests, that the last case, which occurred a fortnight after the removal from the pestilential house, was the result of contagion from the other children at the farmhouse. It is well to note that not only was the house detached, but the cesspool had long been disused. It appears therefore scarcely possible that a specific diphtheritic poison could have got into the cesspool from without: the poison must have been compounded within the precincts of that foul receptacle. Some time since I told the story which I have just now read to a medical officer of health, and he expressed his belief that the cesspool had nothing whatever to do with the diphtheria! His incredulity affords a good illustration of the very different impression which is produced upon different minds by the same evidence.

My friend Mr. Salter, of Tolleshunt D'Arcy, in Essex, who has had a large experience of diphtheria, writes to me that he has "had unquestionably a great many cases of diphtheria, whose origin can be distinctly traced to sewage poison, either gaseous or liquid," and he gives me some particulars of an outbreak in one family, four children and a nurse having been attacked in quick succession, which he attributes to the percolation of sewage into the well which supplied the family with water.

I look upon the occurrence of an indigenous case of diphtheria in a house as an indication of the necessity for a most rigid inquiry into the condition of the drainage and the water-supply. At the beginning of the present year a gentleman living in one of the best houses in Queen's-gate asked me to see his butler, whom I found suffering from a severe attack of diphtheria. The basement of the house looked the perfection of cleanliness, but I advised that a sanitary engineer should be called in to inspect the premises. The result was the discovery of an untrapped sink-pipe near the butler's sleeping-room.

It is notorious that in the houses of some of the most exalted and wealthy, and in open country districts, the sanitary defects which originate such diseases as diphtheria and typhoid fever are almost as common as in the meanest cottages and in the most crowded cities; but it is obvious that overcrowding in the small rooms and cottages inhabited by the lower classes must greatly increase the danger arising from other insanitary conditions.

In opposition to the doctrine which I am now advocating, it is sometimes stated with perfect truth that diphtheria never visits some houses which are dirty within and without, and

which are surrounded by every form of abominable filth. The reply to this is, that no one believes that any and every kind of foul emanation from decomposing organic matter will suffice to cause diphtheria. As every black powder containing charcoal is not the explosive compound which we call gunpowder, so every fetid gas escaping from a drain or a cesspool is not laden with the perilous stuff which will excite diphtheria. We believe that a combination of conditions, local and atmospheric, is required to generate or develop the morbid poison, and the absence of any one of these may prevent its formation. I learn from Mr. Salter that on several occasions, after his district has been free from the disease for many months, he has "suddenly been called to three or four cases in *one day*, at distances of ten or twelve miles apart." Such an occurrence can be explained only by the theory of some widely diffused atmospheric influence concurring probably with local insanitary conditions. Mr. Salter tells me that although he has "had cases occurring in every month of the year, July, August, and September seem to be the months chiefly preferred by the disease." These are the months during which, in consequence of the high temperature, the decomposition of organic matters would generally be most active. The analogy of other diseases renders it probable that besides temperature there are other climatic conditions which favour the occurrence of diphtheria at one season rather than another.—*Lancet, Jan* 2, 1875, *p.* 8.

11.—ON DIPHTHERIA.

By Thomas Prangley, Esq., Aylsham.

[An outbreak of diphtheria occurred at Aylsham in 1868, and this paper is founded on notes of fifty-six cases.]

The variety of forms which the false membrane assumes, and the various conditions of the tonsils, are very remarkable; thus I have seen the membrane in consistence like glazed starch, cream, wet parchment, and a greyish flesh-like pulp of all degrees of colour, from the purest white to almost black. I have seen it in specks, patches, shreds, and in large firm membranes, forming an exact cast of the part it enveloped. I have een the specks or patches surrounded by a bright red border, or gradually becoming thinner at the edges, imperceptibly losing itself, so that one could not exactly say how far it extended. I have seen the tonsils engorged to such an extent as to almost meet, or enlarged laterally, as if they had been flattened by a weight on their surfaces; and I have notes of one case in which the tonsils were rather depressed. The glands at

the angle of the jaws were more or less enlarged; but I never saw them suppurate.

On a few occasions, after the entire disappearance of the membrane, I found the tonsils again speckled all over with small white cheesy spots. These need cause no alarm; for, though they remained *in statu quo* for some days, they always disappeared without further inconvenience.

One of the worst signs in this disease was the extension of the membrane to the nares, so that I looked suspiciously upon the unfortunate patient, who began to use the pocket-handkerchief too freely. This invasion of the nares was manifested by redness of the margin of the nostrils and a discharge of thin mucus, which rapidly became purulent and, as the disease progressed, very abundant.

Passing over many interesting points in the clinical history of this disease, I proceed to the practical question of its treatment, which resolves itself into—local, directed to the throat itself; general, to combat with the great tendency to depression of the vital powers; and individual means to relieve certain symptoms which may arise during its course.

The local treatment I adopted in every case was the application of tincture of iodine (forty-eight grains to one ounce) to every part of the throat covered with membrane at least once in twenty-four hours, and the inhalation of iodine vapour mixed with steam, but more especially the latter, if the larynx were invaded. If the membrane were firm in texture, and not too strongly adherent, I always removed it and applied the tincture of iodine to the denuded surface, and with the best results; for, although frequently the membrane would re-form, yet it never regained its pristine condition. If the membrane were in specks or shreds, I applied the iodine over them, and in general half-a-dozen applications were all that was required to procure their dismissal, and in several instances two applications were sufficient. This local application of iodine acts, not only as a caustic, but, I believe, confers a modifying influence upon the secreting structure, and further brings into action the power of the absorbents; thus tending to retard the spread of the membrane and to promote the removal of that which is formed. I am aware that, in urging this treatment, I am at issue with many who contend that, this disease being a general one depending upon certain changes in the blood by the introduction of a specific disease-poison, it is useless to attack the local manifestation of the disease any more than the pustules of small-pox. To those I would call attention to John Hunter's axiom, that two similar diseases cannot coexist in the system at the same time. For example, he states that, if you can succeed in changing the nature of an inflammation, you

can often cure the original complaint. Higginbottom's method of arresting the spread of erysipelas by vesication with nitrate of silver is a familiar illustration of this Hunterian law; and, if that treatment be effectual in erysipelas, why should not a similar treatment be equally efficacious in diphtheria? Again, I believe that the local manifestation of blood-poison is of itself a great indication for treatment; for do not all poisons have some definite and specific action on some membrane or organ? Thus does not arsenic exert its influence chiefly on the mucous membrane of the stomach, colchicum on the ligaments, cantharides on the kidneys, and strychnine on the spinal cord? Then why should not the throat be the chief seat of the diphtheritic poison, and, if so, why should not the rational treatment be to arrest and destroy it at its first encampment? Again, if my experience be correct, that one of the most formidable symptoms we meet with is the extension of the membrane to the nares and trachea, and, if my opinion be correct, that it does not arise there by an independent centre, but by extension of the membrane from the fauces,—is not this an additional reason for staying the progress of the membrane and limiting it to the fauces, whether we adopt caustics or any other means with that object in view? That iodine possesses this property, I feel convinced; and, as I am not reading to you a treatise on diphtheria, but simply my own experience, I shall not enter into the merits or demerits of the various remedies which have been vaunted by numerous successive writers. The efficacy of any treatment is proved by its results; and, as I have stated, out of fifty-six cases which I have noted, seven died, of which five were moribund when seen, and only two died fairly after treatment.

The general treatment was supporting and stimulating throughout. A liberal supply of beef-tea, wine, and milk was frequently and regularly given, to maintain the system against the natural tendency to depression and exhaustion. In medicine, I rely upon chlorate of potash and tincture of steel, from three to five grains of the former with five to fifteen minims of the latter every four hours, according to age. When tracheal symptoms arise, I at once have recourse to the inhaler, beginning with ten drops, increasing to a drachm of the common tincture of iodine to a pint of boiling water, and letting the patient inhale as frequently as possible. In using this, one precaution is necessary, and that is not to begin with too large a supply of iodine, otherwise it is too irritating, causing the patient to cough, and making him unwilling to use it. I have found ten drops well borne to begin with; and, after a short time, we may gradually increase the quantity to a drachm to the pint without inconvenience. If this do good, which it un-

doubtedly does, it is evident it cannot be by any caustic action, but entirely through its modifying and absorbing influence upon the diseased tissue. I can refer to three cases in which this treatment was of marked utility. In cases where the fits of dyspnœa are severe and frequent, I have found nothing like an emetic of sulphate of copper, which generally expels a quantity of membrane from the larynx and trachea, and gives relief for a time at all events.

In tracheotomy I believe we may place considerable reliance, although my experience is limited to one case, and that unfortunately a fatal one; yet I firmly believe that, if it be resorted to soon enough, we may rescue many lives. There is no doubt one feels inclined to put it off as long as possible; for parents have a curious repugnance to having their children's throats cut; and, if you are not successful, they speculate upon what assistance you afforded nature in her process of dissolution, and generally the balance is against the doctor; yet the evidence of numerous published cases, of which, roughly speaking, one-fourth were successful, proves that it is our duty not to neglect this chance of saving life, and more especially not to delay too long in resorting to it.

The treatment of the numerous sequelæ is difficult to formulate. I believe time and the *vis medicatrix naturæ* to be our most important agents; yet something can and ought to be done, for it would indeed be cruel to leave a poor patient totally paralysed without the hope of some assistance to the slow progress of nature. In those cases, I generally prescribe the liquor strychniæ in five-minim doses, gradually increased to twelve, three times a day; but I candidly confess I think it often did no good, for I well remember one case in which I gave it for a whole month, the paralysis steadily increasing the whole time. I then left it off, and prescribed a liniment as a *placebo*, when gradual improvement commenced, and recovery ultimately took place; but, on other occasions, I have found it decidedly of service, though I am doubtful whether it be more active than quinine, mineral acids, and other tonics. I believe we must show our discretion by changing our tonics, till we find the one best suited to the individual case, than by habitually using one formula indiscriminately. In addition to the tonic regimen, I recommend, when practicable, a judicious change of air and scene. On one occasion, I had resource to galvanism, with no satisfactory result. I believe that rubbing and shampooing the limbs is of some service; at all events, it does no harm; and the simultaneous use of a little embrocation no doubt assists the charm. Some of the dyspeptic symptoms I found very troublesome to treat. As a rule, bismuth gave the most relief, combined with bland nourishment; and, when the acute

symptoms had subsided, a combination of quinine and strychnine was of marked benefit in giving tone to the digestive organs.

For the tendency to faintings which sometimes occurs, I have given a dose of ether; but what is most important is to enjoin the recumbent posture till convalescence is well established, and even then I recommend a little wine to be taken before any exertion is used.

Having alluded to the general treatment of diphtheria and its sequels, there yet remains to be mentioned other minor points, which are of considerable importance to the suffering individual, by which we may alleviate suffering and hasten recovery. For example, where the patient complains of sore-throat *ab initio*, I have found an iron gargle (two drachms of the tincture to half a pint of water) beneficial; but this I have found too cutting when the membrane has disappeared, and then I have substituted one of borax and glycerine (two drachms of the former and one ounce of the latter to half a pint of water); and this gargle I have also found very useful to relieve the sensation of bread-crumbs and tickling in the throat, of which complaints are frequently made during convalescence. Where the denuded surface has proved to be ulcerated, a few touches of nitrate of silver assist the process of repair; and in one case where the tongue and roof of the mouth was so sore, that everything that was taken gave pain, I found that great relief was experienced by applying dry trisnitrate of bismuth powder with a camel's hair pencil just before taking food. In paralysis of the soft palate and regurgitation of fluids through the nostril, holding the nose during deglutition will be found very much to assist the act: this a patient of mine found out for himself, and I subsequently confirmed his statement in other cases. In these cases, too, I always advise thick drinks, which are more easily swallowed. When the pharynx is also affected, a large bolus is much more easily passed down than a small one, so that I have advised the collection of all the food in the mouth into one mass before swallowing. This is no doubt accounted for by the weakened muscular fibres of the pharynx being enabled to grasp a large bolus with less contractile effort, than would be required for a small one. In one case, I kept a patient alive for some days by giving the yolk of egg unbroken, and letting it glide down his throat, as it were. These are a few practical hints, which, from what I have seen, I believe to be useful; but the ingenuity of the practitioner will often be put to the test in coping with the anomalous symptoms which sometimes arise during the progress of this horrible, though interesting disease. Much might be written upon this important subject; in fact, a single

case will often afford, in its chequered course, abundant matter for a long paper; but I have endeavoured to be as brief as possible, and, with that object in view, have entirely excluded the histories of cases which I should otherwise have liked to introduce.—*British Medical Journal, Jan.* 9, 1875, *p.* 40.

12.—ON THE RELATIONS BETWEEN DIPHTHERIA AND SCARLET FEVER.

By Dr. Arthur Ransome, M.A., Lecturer on Public Health in Owen's College, Manchester.

The following case shows the close connection between these two diseases.

On February 23rd last year, a boy at school had scarlet fever. He was isolated until March 25th, when his brother saw him and took the complaint. Other cases occurred at the school on the 29th, 30th, and 31st. On April 2nd, one of the masters had a rigor and sore-throat; he left at once, and was seen by me next day. On the third day, diphtheritic patches covered the tonsils; but there was no rash. Slight albuminuria accompanied the pyrexia; both disappeared by the seventh day. On April 9th, six days after he arrived at home, his mother was attacked, membranous exudation appearing in both tonsils; but there was no albuminuria, and no rash.

The origin of these cases must surely be traced to the epidemic of scarlet fever at the school; for there were no cases of diphtheria either in the neighbourhood of the school or near their home. The close relationship of these diseases has often been pointed out. In the *Report of the Medical Officer to the Privy Council* for 1859, Dr. Burdon Sanderson gives cases of diphtheria and scarlet fever coexisting; there also I find three cases of diphtheria following three of scarlet fever, and the former spreading to a neighbouring cottage. These diseases have much in common. They are alike in their zymotic or epidemic character; both are characterised by high pyrexia; their chief point of attack is the throat and the glands of the neck; and a rash is found in both diseases. Their sequelæ also are similar: suppuration in the lymphatic glands, ulceration of the ears, arthritic affections with or without cardiac complication, kidney-disease and dropsy, general or localised paralysis of the nervous system. I have seen each and all of these consequences after both diseases.

Some physicians have been led by these points of resemblance to regard them as one disease, the same poison producing different manifestations; but, in spite of their similarity, I

venture to think the differences are too important and too numerous to permit so simple a solution of the problem. In the first place, diphtheria is seen to arise directly from scarlet fever. I have never known the converse action. There are other etiological differences. Though both are contagious, diphtheria is less so, and more frequently occurs in single cases. Where several cases occur together, some general cause is probably concerned. Scarlet fever is more frequently conveyed by clothes or other fomites, by attendants on the sick, and it may be conveyed by means of milk. I am not aware that diphtheria has ever spread by any of these means. The two diseases differ in their geographical distribution. Diphtheria is common in India, where scarlet fever is unknown. Colonies and all new settlements seem peculiarly liable to diphtheria; it has appeared in the Australian colonies and in South America, attacking the otherwise healthy town of Buenos Ayres. In Lima, it was noticed that the black races withstand its contagion. It selects high and well drained districts, when low-lying lands in the vicinity escape. Dr. Blake, in the *Transactions of the Medical Society of California* mentions a most fatal epidemic at an elevation of 4,000 feet. Many places in England subject to diphtheria are either high or well drained. Scarlet fever also haunts certain places; but these scarlet fever-fields are not at high levels, nor are they those in which diphtheria is especially prevalent. Diphtheria is often connected with defects in the house-drainage, not always due to imperfection in the house-connection with a general sewage system, but to leakage from private cesspools; so that a question of spontaneous origin may arise in this disease, which is hardly admissible with respect to scarlet fever. Season has a different influence on the two diseases; scarlet fever being most prevalent in the autumn, low barometric pressure and greater humidity in the air favouring its diffusion; while diphtheria may arise at any season, and, in my own experience, its most virulent epidemics have occurred in the summer months.

Another difference is found in the fact that scarlet fever is not often associated with other diseases, while diphtheritic affections are not uncommon in the course of other pyrexial disorders. It is recorded in the Report of the Diphtheria Subcommittee of the Epidemiological Society, that in the epidemic of 1861, this disease occurred fifty-seven times alone, thirty-four times in association with scarlatina, nine times with small-pox, seven with measles, six with fever, and three times each with ordinary sore-throat, croup, and catarrh. But in the nature and symptoms of the two diseases are points of unlikeness too great to allow us to rank them as varieties of the same species. Thus, the rash of diphtheria is often absent, is

very variable as to the time of its appearance; it occurs seldom at the outset of the malady, and I have seen it as late as the third week of its course. The period at which albuminuria sets in is also different, often appearing in severe cases of diphtheria within the first two or three days, whilst in scarlatina it seldom sets in until degeneration of the kidney is commencing. There is, indeed, an entire absence of definiteness about the duration of the symptoms of diphtheria, which of itself marks it off from the regular sequence of events in scarlet fever. I have known it last for six weeks, and even two months, without any evident affection of the cervical glands, but with constant formation of exudation on the fauces or on other mucous surfaces.

The mode in which diphtheria localises itself on the mucous membranes, or on the broken surfaces of the skin, would probably be sufficient to separate it from any other disease. I do not know that scarlet fever ever attacks the larynx; but I have seen the diphtheritic membrane appear in different cases upon wounds of the skin, upon blistered surfaces, and upon nearly all the mucous membranes of the body—the lips, cheeks, nose, ears, pharynx, larynx, trachea, and bronchi, and on the anus and vulva; and different epidemics have differed strangely in this respect; in one, the throat would always be the point selected for attack; and in another, the other mucous membranes. It is somewhat remarkable in the latter case that, although the disease was mild and there were no deaths, the subsequent complications were much more frequent and troublesome.

The last point of difference that I shall mention is the fact that, while scarlet fever seldom reappears again in the same individual, diphtheria seems by its first attack to confer no immunity from subsequent seizures; on the contrary, the susceptibility of the throat seems to be rather increased.

Upon taking a survey of all these relations existing between scarlet fever and diphtheria, it is evident that they are distinct diseases, and yet there is some very close and definite connection between them. Wherein the bond consists, it is not easy to point out. From the manner in which the diphtheritic poison seeks out the highest points of the best-drained localities, it has appeared to me most probable that the virus of this disease must be of a more rarefied and subtle nature than the germs that produce scarlet fever.

It is possible that the nature of some other ferments may throw some light upon this subject. I would specially call attention to the discovery by M. Berthelot (*Comptes Rendus*, vol. l, p. 980) of an unorganised glucosic ferment in an infusion of yeast resembling diastase; also to the fact that one

fermentation by organised beings frequently prepares the way for another. It may be suggested, that in one of these ways the singular relations existing between scarlatina and diphtheria might be accounted for. I do not venture to affirm that there is a strict analogy between these fermentative actions and the zymosis of scarlatina and diphtheria; but, as there exist in nature ferments requiring the presence of living germs, and others acting independently of them, so there are disease ferments with organic germs reproducing themselves, and others which have no definite term of life, and which are not self-reproductive.

It is probable that, in most cases of fermentation, the living being connected with each kind of this action is of a specific nature, and peculiar to the medium or to the food upon which it lives. In some instances, a ferment either during or at the end of its operation will produce the conditions favourable to the growth of another kind of germ, as seen in the crowd of vibrios appearing at the end of a mycodermic fermentation; so the pyrexial state may produce the condition most congenial to the diphtheritic ferment, whether that may prove to be an organised germ or an unorganised catalytic ferment. As my excuse for offering these suggestions, I will quote, in conclusion, the words of the great English philosopher Robert Boyle. "He that thoroughly understands the nature of ferments and fermentation shall probably be much better able than he that ignores them to give a fair account of several diseases (as well fevers as others) which will perhaps be never thoroughly understood without an insight into the doctrine of fermentation." (*Works*, ed. 1744, vol. i, p. 476.)—*Brit. Med. Journal, Feb.* 6, 1875, *p.* 171.

13.—ON THE TREATMENT OF RHEUMATISM AND GOUT WITH TRIMETHYLAMINE.

By Dr. W. H. Spencer, A.M., Physician to the Bristol Royal Infirmary.

First, as to the history of trimethylamine, and as to what it is.

Wertheim, in 1850, prepared from narcotine a body having the formula C_3H_9N; he called it *metacetamine*. Anderson, in 1850, prepared from codeine a body having the same formula; he named it *propylamine*. Hoffmann, also in 1850, showed (from his own and Würtz's researches) that by the substitution of three molecules of methyl for the three hydrogen atoms of ammonia a body was formed having the formula C_3H_9N; this body was according to Hoffman's nomenclature, *trimethylamine*. Wertheim soon after extracted from herring-brine a body

isomeric with his metacetamine; thenceforward he adopted for both bodies the name propylamine. And now, many chemists drew from many different sources, animal and vegetable (cod-liver oil, human urine, putrid calf's-blood, guano, ergotine, chenopodium vulvaria and numerous other plants), a body having the formula C_3H_9N. Always, this body was called propylamine; the substitution-body prepared artificially in the laboratory was, as yet, the only trimethylamine. Then the reconciliation took place, and chemists (following up Würtz's and Hoffman's researches) found that the body got from natural sources was not propylamine at all, but the same in all chemical respects as the artificial compound ammonia called trimethylamine. *Propylamine* is a primary compound ammonia (monamine). *Trimethylamine* is a tertiary compound ammonia (tri-amine). Thus:

$$\left.\begin{matrix}\text{Propyl } C_3H_7 \\ H \\ H\end{matrix}\right\} N = C_3H_9N \text{ (Propylamine).}$$

$$\left.\begin{matrix}\text{Methyl } CH_3 \\ CH_3 \\ CH_3\end{matrix}\right\} N = C_3H_9N \text{ (Trimethylamine).}$$

Essentially the difference is in the radical; *propyl* is one thing, *methyl* is a different thing altogether. It is methyl that exists in the body extracted from narcotine, codeine, herring-brine, and all the natural sources already named; which exists, that is to say, in our new remedy for rheumatism. I do not know that propylamine has been obtained from natural sources at all. I believe it is as yet only an artificial product, got by treatment of the iodide of propyl with an alcoholic solution of ammonia.

Both the solution and the salt have generally been prescribed on the Continent in the form of mixture, the vehicle being aqua menthæ piperitæ, and aromatics being used to disguise the unpleasant taste. The dose employed has varied much; it has ranged from 9 to 30 mimims for the solution, and has not exceeded 10 mimims for the salt. The chloride has been used in the form of pill (made up with marsh-mallow, honey, and tolu), and the solution in the form of capsules. I have, except in two instances, invariably prescribed both trimethylamine and the chloride in the form of mixture, and my formula is this:—

℞. Trimethylamini ♏iv. vel viij♏
Syrupi zingiberis ʒj
Aquæ menthæ piperitæ ℥j. Misce.

Talis fiat modus, secundâ, quâque horâ sumendus.

And, as supporting the probability of variation in composition,

I have at different times found that the same results were obtained with a dose of two minims as with a dose of eight minims. Now, I give always four to eight minims, at first every hour or two hours, increasing the interval as the pains diminish and the case progresses. When all pain is gone I cease to give the remedy, and substitute, in most cases, quinine. Rarely have I to re-exhibit the trimethylamine, but I do so if pains recur.

Next, for my cases. They are sixty in all; and of these I propose to relate only so many as may be of use for illustration of the effects of the remedy, and for commentary on the effects —whatever they may have been.

Case 1.—G. C., aged 50, a coachman. A healthy man up to forty years of age, and always in good circumstances; had lived freely and drank a good deal of beer. When forty had an attack of gout, the toe only being affected. The next year had another attack; this time the knees were affected. During the next eight years had four attacks, in the last of which six months ago) several joints were affected, and he was in bed for six weeks. He always remained weak for some time after the attacks. No family history of gout or rheumatism; has a tophus in the auricle of the right ear. The present attack dates back three weeks; whilst washing his carriage he thinks he caught cold. The first joint affected was the metacarpo-phalangeal of the right third finger (he says he had received a blow on this finger just before). Subsequently the left knee and hip and the right elbow and shoulder became involved in succession. Admitted on June 20th, 1873. He has pain in all the joints above named, severe and preventing movement, and nearly all the affected joints are swollen. The local heat is considerable, without redness. There is little general pyrexia; the skin is moist; tongue white; pulse 80; has no appetite. The urine is acid, specific gravity 1·020; no albumen. There is no cardiac affection, old or recent. *To take two minims of trimethylamine every four hours.* 21st: There have been frequent remissions in the severity of the pains; otherwise is much the same. 22nd: Has no pain at all when lying still; the pains, he says, ceased suddenly at 10 a.m. (forty hours after the first dose). 23rd: Slept well; has a little pain at times in the shoulder and in the finger-joint of the left hand; can raise himself in bed with little discomfort; the swelling is hardly appreciable; he feels much better, and *very hungry*. 26th: Has no pain at all; can move freely and feels well. *To take the mixture three times a day.* 28th: Is up and able to walk easily. *To take quinine.* July 6th: Some slight pain and swelling have recurred in the finger-joint of the left hand. Has been in the garden daily for four days. 9th: The finger got well very soon, and he was discharged to-day well and strong.

[This I take to have been a case of gout. The man himself expressed surprise at the rapidity of his recovery, as compared with all the previous attacks. Two points in the case deserve notice: in less than three days the appetite returned; the man felt hungry and requested more food: the recovery of strength was rapid and marked. These are very frequent effects of the remedy.]

Case 2.—J. B., aged 49, a brewer's cellarman. Has been working in wet cellars, frequently standing in the wet. About once a month, for some time past, he has had attacks which compel him to keep in bed for a week. These begin with pains in the wrists, thence extending to other joints, and finally involving the whole body; he loses all power of motion, and even has to be fed. In the intervals he is weak, has frequent pain, and is unable to move freely. Admitted as an out-patient April 8th, 1873. He is now reduced to a very crippled state, and is weak and miserable. The left leg, from the knee downwards, is much swollen, livid, and purpuric. From this date to June 24th was treated with quinine and iron, cod-liver oil and iodide of potassium, with improvement only to the general health. June 24th: Has now pain in both legs and the left shoulder, which is very severe at night. The attacks have occurred as before. He walks with great difficulty, *To take two minims of trimethylamine three times a day, and pills of iron and quinine.* Took the medicine for a week, and came up on July 8th, no better. Then he took the medicine *every four hours* for a week; he felt much better the week after, but during the following week had one of his attacks in a modified form. Came up on July 29th. The mixture was repeated, and in a fortnight, August 12th, he was quite free from pain. A fortnight later, August 26th, he was still free from pain, and much stronger. *He was put upon quinine.* In another fortnight, September 9th, he was still free from pain, and had had no attack. Was much improved in health; appetite good. The leg was better, but still somewhat swollen and purpuric. Ceased attendance. I saw this man in September 1874 twelve months after he ceased attendance. He was then looking well; had been quite well and quite free from anything like rheumatism. The leg was better, but still stiff and brawny.

Case 3.—A man, aged about 45, had been an in-patient from January 28th to July 7th, 1873, for chronic rheumatism, dating from November, 1872. He had been treated in many various ways, with some relief; but had never been quite free from pain. He came under my care, as an out-patient, July 11th, 1873. At this time he suffered severe pain in the shoulders, hips, knees and ankles; was very weak and decrepit, could not stand upright, and walked with great difficulty. *He*

took two minims of trimethylamine every four hours, and pills of quinine and camphor. In a week the pains were much better, but he had had some diarrhœa. In a fortnight more he was quite free from pain, and was then put upon *quinine and cod-liver oil.* A month after he was still free from pain, and was altogether a different man ; he was able to walk without a stick, and was back at his work.

[These two cases of chronic rheumatism are interesting from the fact that both patients, before taking trimethylamine, had been subjected to prolonged treatment in other ways. The first was under the care of a colleague, and the other under my own care during the whole of this time. Both patients were intelligent and respectable men, From the fact that, being out-patients, the men could attend at their discretion, and were only supplied at each visit with medicine enough to last for a week, little can be said about the effects of the remedy beyond the broad fact that these men were cured of a long-standing ailment, the one within three weeks and the other within five weeks. It is noticeable also in Case 2, that two minims of trimethylamine taken three times a day failed to produce any good effect.]

Case 4.—A. S., aged 11. Had been ailing for a few days, when he got very hot, and then stood about without a coat in cold and damp night air, Felt very chilly, and shivered the same night, August 11th, 1873. The next morning he had pains all over, especially severe in the fingers and groins. On the 16th, had not much pain except in the groins, where it was worse than before. On the 18th he was very bad; the groins were very painful, and now also the right ankle was extremely painful and swollen. There was considerable pyrexia; the tongue white, and no appetite. The treatment up to this time had been chiefly by warm baths. *To take two minims of trimethylamine every two hours* (began at 12 noon). 19th: The pains remitted during the day, and by the evening were much less severe; the ankle was less swollen. 20th: Slept well during the night. On awaking at 6 A.M. the boy found he had no pain anywhere, so he got up, dressed, *put on his boots*, and went about his play as usual. He was very hungry at breakfast, was pretty well all day, and walked about a good deal. *Citrate of quinine and iron* was substituted for the trimethylamine at noon. All trace of the attack passed off in a day or two.

[This case occurred in my own house, and is of interest and value because I was able to watch it closely throughout.]

Case 5.—W. M., aged 31. Had been in the infirmary for gonorrhœal rheumatism until August 14th, 1873. Was readmitted on August 28th, with very severe lumbar pain and pain in the left foot; the foot was swollen. *To take four minims*

of trimethylamine every two hours. The pain gradually decreased, until, on Sept. 5th, he had no pain at all when lying still, and felt better in himself. The pains did not leave him entirely, and on Sept. 10th he was put upon *iodide of potassium.* Sept. 15th: Continues much the same; the back is bad again, and one knee is affected. *To take five minims of trimethylamine every two hours.* Sept. 22nd: Is much better; the pain has gone. Was put on *bicarbonate of potash with liquor cinchonæ.* Sept. 27th: He is worse again. The iodide of potassium in ten-grain doses was repeated. Oct. 18th: The iodide has been continued; the man has improved, and is discharged to-day, pretty well.

[I have not found that trimethylamine is able to do any good in such cases as this. Yet it would seem that some temporary relief occurred on the two separate occasions of its exhibition. In another case, a man who, eight months before, had been in the infirmary for syphilis, was admitted under my care for rheumatism. I treated him with trimethylamine on four separate occasions, with some relief to pain each time. A cure was at length effected by iodide of potassium.]—*Practitioner, Feb.* 1875, *p.* 90.

14.—ON SATURNINE GOUT.

By Dr. Samuel Wilks, Physician to Guy's Hospital.

One of the most interesting facts in connection with lead-poisoning is the production of gout, and apparently true gout; since the arthritic inflammation is due to the deposit of urate of soda in the joints. I have seen this gouty condition so very often, that I have no hesitation in confirming the statement of Garrod and others, by whom the remarkable connection was first observed; for, in several of my cases, the patients were young, and the ordinary predisposing and exciting causes were not present. I believe the observation is comparatively recent, for the great authority on lead, Tanquerel des Planches, does not refer to it. It is true, that he has a chapter on saturnine arthralgia; but he evidently does not refer to the joints, but to the limbs, as his equivalent expression is "douleurs neuralgiques des membres," referring to nerve-symptoms, which, I may tell you, were known to the Greeks as one of the effects of lead.

It is remarkable that not only is genuine gouty inflammation of the joints caused by lead, but of a necessity all the other usual concomitants of gout. Therefore, it is constantly observed that workers in lead not only have chalky joints, but have granular kidney, thickened blood-vessels, and the other changes constantly met with in gout, and which are almost

synonymous with those of Bright's disease. In the present case, the urine was slightly albuminous, and the arteries slightly rigid and tense, suggesting the early condition of the change which I name.

This connection of lead and gout is so remarkable, that we naturally try to discover where it lies. We must first ask ourselves what we mean by gout. We generally mean by it that morbid condition of system which is due to the production of an excess of urate of soda, owing to a malassimilation of food. Now, this may occur under various circumstances from different causes; as, for example, the taking of too much nitrogenous food or wines, which directly favour its production; or, in other cases, from want of exercise, and consequent failure to get rid of the effete material; and, in other cases, to simple atony of the stomach in nervous and weakly subjects. The question, therefore, which we have to ask is, in what way lead-poisoning so affects the digestive and assimilative processes as to favour the production of this salt. This, we believe, is the question to be asked, and not a simple chemical one, because we find attacks of gout caused by disturbances of the nervous system, and relieved by such remedies as quinine, mineral acids, and colchicum; causes and remedies which can only indirectly affect the functions before named, and do not act by simple chemical methods, When we think we can solve difficult questions in pathology and therapeutics by known laws, let us ask ourselves how lead causes gout, and how colchicum cures it.—*British Medical Journal, Jan.* 2, 1875, *p.* 10.

15.—THE TREATMENT OF ACUTE RHEUMATISM.

By Dr. Thomas S. Dowse, Medical Superintendent of the Central London Sick Asylum, Highgate.

I believe it is usually admitted that the *materies morbi* circulating throughout the entire body in this disease is of an acid character—lactic, if you will; and, although there might be some doubt as to whether this be correct or not, still it is quite certain that we have a condition to deal with in which acidity is the most prominent feature. I am not aware that its causation has been explained in any more definite way than that it is in all probability the product of malassimilation producing faulty tissue-metamorphosis. The vagueness of such a definition as this must at once be admitted. It is quite certain that especial individuals are prone under fixed laws to the generation of this rheumatic factor; that the like individuals are especially subject to a nervous condition known as chorea, and that these alternate in the same person is a matter of daily observation;

but the relation which this has to the etiology of acute rheumatism, on the one hand, and chorea on the other, has never to my mind been explained.

For some time, the alkaline treatment so much advocated by the late Dr. Fuller held unbounded sway, and the admirable tables drawn up by Dr. Dickinson in 1869 prove most incontestably that alkalies have the power to prevent endocardial and pericardial inflammation. In this year, Sir William Gull and Dr. Sutton somewhat startled the profession by bringing forward a number of cases successfully treated by mint-water; in other words, by adopting careful regimen, mechanical and physiological rest, and allaying pain by opiates. Under this treatment) the average duration of the acute symptoms was seventeen days. Some years ago, when I was registrar at Charing Cross Hospital, the treatment of this disease occupied my serious attention. Dr. Salter gave three grains of quinine every three hours, whilst Dr. Headland gave alkalies. I then found that the course of the disease was cut short by the quinine, but that the tendency to heart-complication was greater than when it was treated by alkalies. From a careful survey of the various modes adopted in the treatment of acute rheumatism, including vapour-baths, lemon-juice, tincture of iron, aconite, hydrochlorate of trimethylamin, blistering, and others, I am inclined to think that its progress can be cut short by the means which I shall immediately explain to you, and that cardiac inflammations can be avoided. I am right in stating it to be an admitted rule that, if valvular disease of the heart or pericarditis supervene upon an attack of rheumatic fever, it does so within the first week or ten days. This is to a certain extent undoubtedly correct. I am one of the few who believe that inflammation of the endocardium is a constant attendant of the acute rheumatic state, not giving rise in many cases to valvular lesion at the time, but predisposing to subsequent change, which reveals itself under circumstances apparently the least provocative. It is quite true that in acute rheumatism no absolute *bruit* referred to the sounds of the heart can, in the majority of instances, be detected, and at the base the sounds will be clear and natural in rhythm, but at the apex they will be attended by a characteristic turbulence and commingling, which, with the hurried action of the heart and feeling of oppression in the epigastrium, will be indicative of hyperæmia of the mitral valves.

Thus it seems to me that, in the treatment of rheumatic fever, we have, first, to consider the best way to eliminate the acid products of the diseased state; secondly, to relieve pain. Beyond this, the case can be treated as an ordinary one of functional glandular derangement, or febricula; for, when

once the sour secretion from the skin is eliminated (no matter how acid the urine might be), the pain subdued, and the temperature influenced, we need have no fear of heart-complication arising. Then comes the question, What are the best means, if there be any, to bring about this condition?

During the past three years, I have been in the habit of packing most of my cases in a wet blanket, and afterwards rolling them up in dry blankets, so as not only to promote profuse sweating, but also to increase the temperature. This mode of procedure, which I conducted in a very indefinite manner, gave such good results, that I thought carefully over the *rationale* of the system, and at once adopted a course of wet packing after the manner and with the success which I will relate. The procedure is simple. The bed is covered with India-rubber sheeting; over this is laid a blanket which has been wrung out of hot water. The patient is then enveloped in the blanket, and covered with six folds of dry blanketing. By this, the temperature is raised and profuse sweating results: the former, if need be, is assisted by the administration of brandy in half-ounce or ounce doses every hour, and the latter by giving freely warm milk and water. If the temperature exceed 102 deg., then the stimulant is unnecessary. My plan is to continue the treatment for three successive days; namely, for six hours the first day, four the second, and two the third. After the first pack, the patient is free, or nearly so, from pain; after the second pack, the pain has completely subsided, and after the third pack the sour smell usually disappears. In addition to the relief from pain and subsidence of acid secretions, the pyrexial state, with its attendant symptoms, will be found to decrease in direct ratio, and likewise the pulse. The secretion of urine will become more plentiful and the urea will diminish in quantity; yet, although the improvement is so marked in reference to pain, sweat, pulse, and temperature, the urine remains acid and loaded with lithates, and the tongue coated, for some days longer. It not unfrequently happens, especially in young people, when the weather is variable, that transitory pains return in one or more joints; but in almost every instance the pain has been subdued, if not by the first, by the second bath. In reference to cardiac inflammation, I believe that this treatment subdues it more rapidly than any other, rendering the valves less likely to undergo organic change.

But now comes a very important practical question. There can be no doubt that the packing process produces considerable constitutional disturbance. Under what circumstances should this treatment be adopted, and under what conditions is it not practicable? Every one who has had much to do with this

disease must be conscious of the anxiety which it gives him when the temperature exceeds 105 deg. or 106 deg., and especially when it is associated with the least sign of cerebral disturbance; and, as my treatment consists in elevating the temperature, it will be apparent that some care is necessary. Thus, according to my experience, it should not be adopted—1. If the patient suffer from incompetency of the aortic valves; 2. If there be much fluid in the pericardium from previous inflammation; 3. If the temperature be over 104 deg.; 4. If the skin be hot, dry, and harsh, without the least tendency to sweating; 5. If there be extreme nervous prostration from habits of drunkenness or other vitiating cause; 6. If the patient be pregnant.

Again: during the time the patient is packed, the following points must be observed:—1. If, after two or three hours, the patient become very restless, with a dry non-perspirable skin, I should advise the treatment to be discontinued; also when the temperature exceeds 105 deg.; 2. If the temperature do not rise, and the patient be sweating freely, give half an ounce, or even an ounce, of brandy every hour in warm milk and water. Thus we have to secure profuse sweating and a mean temperature of 104 deg.; we have to guard against a dry skin and a temperature over 105 deg.

Let us consider this a little more practically. If a healthy child be packed for six hours as directed, whose normal temperature is 99 deg., we find that it will only rise one degree during the whole course of the six hours, and the administration of a stimulant will not cause it to rise any more. It is very different during the pyrexial stage of acute rheumatism, and I have proved most unquestionably that, when the packing alone does not increase the temperature, this is easily brought about by giving brandy in the manner just stated. I have adopted this treatment with excellent results in cases where there has been, in addition to the rheumatic inflammation, a mitral murmur, pericarditis, and pleuropneumonia. In some cases, I give medicine, in others I do not. My rule is this: not to give medicine or solid food until after the third packing, and this means not until the acute symptoms have subsided and the temperature is down to 100 deg.; then some vegetable tonic, with solution of acetate of ammonia, is to be preferred to large doses of alkali or quinine. If, however, the case have been of long duration before coming under treatment, and if it be the third or fourth attack, with probably cardiac disease, then of course the orthodox measures must be resorted to for such complications. If the temperature should run very high, with tendency to delirium, I believe the best plan is in every instance, whether under the packing treatment or other-

wise, to apply ice to the head, expose the body freely to a current of cold air, and sponge it over lightly with a mixture of one part of spirit to two of water, until the temperature falls; then to discontinue this, and to apply a sinapism to the epigastrium. The following case occurred in my practice, from which a lesson might, perhaps, be learned. A young robust woman, aged 19, came under my care with incipient acute rheumatism, but with a dry harsh skin and a temperature of 102 deg. I had her packed in the usual manner at 1.30 p.m.; at 4.30 p.m., there was no action of the skin; temperature, 104 deg.; at 6.30 p.m., still no action of the skin; temperature, 106.2 deg.; rapid action of the heart and tendency to delirium. I at once applied ice to the head, bathed the exposed body with spirit and water, and in twenty minutes I was pleased to find the temperature down to 103 deg.; the following morning it was 101 deg. Again: a woman, aged 28, of drunken and dissolute habits, came under my care with the third attack of acute rheumatism; there was considerable prostration and a temperature of 103.2 deg. I thought that I detected a fine murmur obscuring the second sound at the base of the heart. I ordered her to be packed in the usual way; but her temperature continued to increase, until it reached 110 deg., and she died. This is the only case which has terminated unfavourably out of a very large number. Whether the high temperature arose from the treatment, I am unable to say, and, as such cases do occur now and again under any treatment, I must decline to give an opinion.—*British Medical Journal, Jan.* 9, 1875, *p.* 39.

16.—ON THE TREATMENT OF RHEUMATIC FEVER BY A NON-NITROGENOUS DIET.

By Dr. James Andrew.

In the *Lancet* for May 23, 1874, is a report of a paper on some points in the dietetic treatment of disease, read by Dr. Parkes before the Medical Society of Southampton. In it he gives the result of his experiments with a non-nitrogenous diet in dyspepsia and in health and draws the following couclusions from them:—

"A non-nitrogenous and non-saline diet lessens the formation of acid, as the following facts will show.

"The normal amount of free acidity in the urine is usually expressed, as proposed by Julius Vogel, as equal to so much crystallised oxalic acid; the normal daily average amount of free acidity in the urine of healthy men is equal to the acidity of from two to four grammes of crystallised oxalic acid. I kept a healthy man on ordinary meat diet for fourteen days. The

mean free acidity was equal to 2·749 grammes of oxalic acid in twenty-four hours; the highest amount on any one day was 3·369, and the lowest 2·122 grammes. I then put him on a diet entirely non-nitrogenous, and very nearly non-saline. On the first day the free acidity of the twenty-four hours' urine sank to 1·847 grammes, and on the second day to 1·255 grammes, or less than one-half the average.

"I kept another man on ordinary diet for twelve days; the mean daily acidity was equal to 3·406 grammes of crystallised oxalic acid. He was then put on a non-nitrogenous diet for four days; the mean daily acidity of these four days was only equal to ·873 gramme of oxalic acid, or one-fourth the normal amount; on the third day it was only ·618 gramme, or one-sixth the normal amount. He then returned to meat diet, and subsequently was placed again for five days on non-nitrogenous and non-saline food. On the first three days the mean acidity was only ·509 gramme in each twenty-four hours; on the fourth day the amount was only ·0368 gramme, and on part of the day the urine was alkaline; on the fifth day the acidity was only ·444 gramme, or one-eighth the normal amount. I notice also, in Dr. Pavy's excellent book on food, that Mr. Mahomed, in some experiments on a non-nitrogenous diet, found his urine became alkaline.

"Now to ensure this diminution of acidity there must be more than a mere farinaceous and milky diet; at least I found a man, who took only oatmeal and milk, had a free acidity equal to 3·022 grammes of oxalic acid on an average of many days. To produce the effect, the diet must be non-nitrogenous, perhaps non-saline. This diet also increases the flow of urine, so that I am sure it must be found useful in gravel and uric acid deposits generally.

"I was curious to know whether, when a man was on this non-nitrogenous diet, he would pass any uric acid: the quantity of urea daily excreted was of course greatly lessened, and so was the uric acid; but even after three or four days of non-nitrogenous diet, I could still always find a little uric acid in the urine. This seemed to me an argument against the origin of urea from uric acid; for why, when all nitrogen was cut off, and consequently the oxygen must have been in relative excess, should not all the uric acid have been converted into urea, if that is its usual origin in the body? It was not so converted, however, but passed out *pari passu* with the urea, as if furnished by special cells. At any rate we may be sure we cannot entirely exclude uric acid by a non-nitrogenous diet, though we can greatly lessen its amount.

"The second effect produced by a non-nitrogenous diet is a great lessening of the power of the heart, which is perceptible

twenty-four hours after the commencement of the diet. The heart beats more feebly, the pulse is smaller and softer, and if the sphygmograph is used, the height of the up-stroke is only half of what it is in the normal state of the man. This action on the heart is so marked that it should make us watch the effect of a non-nitrogenous diet. The mode in which I gave the non-nitrogenous diet was as follows:—

"Butter was melted in a jug placed in a water bath, and the liquid oil was poured off.

"Arrowroot cakes were make with a portion of this butter, and a little sugar was added. A good cook can thus make very agreeable cakes, which should not be in the least tough. These arrowroot cakes were eaten by my patients with great relish when buttered; they also took arrowroot jelly sweetened."

On reading these statements it occurred to me that the effect produced upon the urine, viz., the great diminution in the amount of free acid and of urea, made it extremely probable that a non-nitrogenous diet might be advantageously employed in the treatment of rheumatic fever; for, as it is scarcely necessary to remind my readers, the urine in this disease contains a large quantity of urea and of uric acid, the index of an excess of nitrogenous matter undergoing more or less perfect oxidation in the system. The alkaline treatment neutralises this excess of acid not only in the urine but in the blood, and prevents its ill effects: the application of blisters, which does somehow cure rhuematism, although its consequences are often troublesome, is attended by a marked lowering of the specific gravity of the urine, which at the same time frequently becomes alkaline. Even in the natural course of the disease, as established by Sir William Gull and Dr. Sutton, this same change in the specific gravity and acidity of the urine takes place at the termination of the acute symptoms. To cut off the supply of nitrogenous matter for a time would seem to fulfil much more perfectly the end sought for by the administration of alkalies, to be free from the inconveniences of the blister treatment, and to assist at any rate the natural process of cure relied on in the expectant treatment.—*St. Bartholomew's Hospital Reports, vol.* x., 1874, *p.* 359.

17.—TREATMENT OF RHEUMATIC FEVER BY CYNARA.

By Dr. E. Copeman, Senior Physician to the Norfolk and Norwich Hospital.

As long ago as March, 1833, I published in the Medical Gazette (vol. xi., p. 844) some cases of rheumatism treated with the common artichoke in the form of tincture and extract. I was at that time the resident medical officer of the Norfolk and

Norwich Hospital, and the physicians gave over to me their cases of rheumatism, that I might put fairly to the test the value of the remedy I had introduced to their notice. The result was so encouraging that I have ever since employed the tincture and extract of cynara in my own practice for the cure of rheumatism, and have been perfectly satisfied with the results. My reason for again addressing the profession on the subject has arisen from the fact of my having had recently some cases of rheumatic fever, which have been more speedily relieved and cured by this medicine than by any other treatment that I have witnessed; and my object is to induce others to give it a trial and to report the results in our widely circulating journal. This will be carrying out, as far as it goes, the idea I wished to impress upon those present at our annual meeting at Norwich—that it might do much good if all who believe they have facts in physic to rely upon, would communicate them to others through the Journal, and court replies from such as will put them to the test of their own experience.

I will describe briefly one or two of the cases of rheumatic fever to which I have alluded as of recent occurrence. The hospital porter, twenty-four years of age, tall and not robust, had suffered from several severe attacks of rheumatic fever. The first attack he had was in 1870, when he was laid up for seven weeks. In the following year, he had a slighter attack, and was only confined for about ten days. At the end of the same year (1871), he was appointed to the London police, only doing night duty occasionally. At the commencement of 1872, he was in Guy's Hospital for ten weeks with a severe attack, which affected all his limbs and the pericardium also. On March 29th in the present year, whilst in his office as porter at our hospital, he was suddenly seized with acute rheumatism, affecting most of his joints, and preventing almost entirely all voluntary movements. He had also a good deal of fever, with rapid pulse, and the peculiar sweating belonging to the disease. He was placed in one of the wards under my care; and, according to my usual plan, I immediately treated him with cynara, and gave it in the following form, viz.: ℞ Potassæ bicarb. ʒ j; aquæ camph. ad ℥ viij; tincturæ cynaræ ℥ j; syrupi papaveris alb. ℥ ss. M. Two tablespoonfuls were ordered to be taken every four hours, with as much of the extract of cynara as would make two moderately sized pills. Lemonade was given him to drink. He very soon got relief; and I find in my notes that on April 24th he had had no pain for a fortnight, and that the swelling left the joints very soon after commencing the treatment. From past experience, the man expected a much more prolonged illness, and was astonished at the speedy relief afforded by the medicine. He

has been performing his usual duties ever since his recovery, and up to the present date (November 19th, 1874) he had no return whatever of this disease.

A girl, aged 19, living in the country, was admitted into the hospital on June 20th, 1874, with rheumatic fever. Her lower limbs were more affected than the upper, and she was quite unable to stand, or bear the ankles to be moved; she was attacked only a day or two before, and both her feet were beginning to swell. She had all the usual symptoms of acute rheumatism, and the urine was albuminous—specific gravity, 1025. I gave her the same pills and mixture as before described, with lemonade to quench her thirst; and in four days she had lost all pain. On the 29th, she was able to walk, and was allowed to leave her bed; on July 6th, she was discharged cured.

Three other cases occurred about the same time, and were soon relieved by the same treatment.

No other medicine has in my experience appeared to be so efficacious as cynara in rheumatism, acute or chronic, but I have frequently heard of its having failed in other hands; and I suspect the reason is that it is often prepared from leaves gathered at an improper time, when there is no medicinal virtue in the plant. The leaves should be gathered just before the top of the vegetable is fit for food, and whilst they are full of juice; if left until the top is cut off for cooking purposes and the plant begins to wither, no good will be derived from it, and, if given, it would be condemned as useless and inert.

Now, as rheumatic fever is a disease of frequent occurrence in almost all localities, though in some more than others, there would be no difficulty in accumulating facts, *pro* and *con.*, if only practitioners could be persuaded to give the treatment I have mentioned a full trial. I am perfectly convinced that no harm would arise to the patients from trusting to it for a time; and I feel, moreover, certain that a very large number would be materially benefited by adopting it. I repeat that it is absolutely necessary to pay attention to the time the leaves are gathered, and to be careful in the preparation of the medicine; and it would be perfectly safe to increase the dose of the tincture gradually from one to four drachms should the case prove obstinate. I know little or nothing about the physiological action of the drug; but Mr. Sutton, a chemist in Norwich, takes an interest in the subject, and will endeavour to ascertain, if possible, the active principle contained in it.—*British Medical Journal, Dec.* 19, 1874, *p.* 768.

DISEASES OF THE NERVOUS SYSTEM.

18.—ON VARIOUS THERAPEUTIC USES OF CALABAR BEAN; ESPECIALLY IN TIC.

By Dr. W. MUNRO, Cupar-Fife; Late District Medical Officer, St. Kitts, West Indies.

Having, in 1871, pointed out the probability of Calabar bean being useful in cholera, from the power which Dr. Fraser has shown it to possess of expanding the peripheral blood-vessels, I have since then thought it might be useful in many other diseases, in which, from one cause or other, these blood-vessels are contracted, but was prevented by various circumstances from applying my ideas in practice until October last. Calabar bean had, up to that time, so far as I am aware, only been used in tetanus, although it has recently been used in general paralysis and acute mania (British Medical Journal, January 10th and 17th).

Tic Douloureux.—Believing that in *tic* the blood-vessels of the part affected are in a state of contraction, I have made use of the bean in several cases with exceedingly satisfactory results. Very short notes of the cases are appended. I may say here that Cupar is a rather low-lying place, in which tic of an intermittent form, which disappears on the person leaving the town, even for a time, is not uncommon. Fever and ague in those who have had it abroad is apt to return. There is, in fact, a slight malarious influence evidently present in the atmosphere.

Case 1.—October 16th, Mrs. D. had tic on the left side of the head. I applied one of Streatfeild's ophthalmic squares to the eye. In about five minutes, she expressed herself as decidedly relieved. This was not a very severe case, which may account for only one square being sufficient.

Case 2.—November 6th, Mrs. X. had severe tic, with intense photophobia, brought on by reflex irritation after several days' severe uterine pain, which had now passed away. I used one square, in the right eye. In ten minutes, she was able to open her eyes and converse cheerfully. In half an hour, I used another, relieving the pain entirely, only leaving a "slightly bruised feeling," which was almost entirely removed by another half. The pain did not return, and no more Calabar bean was required. The pupil was never contracted.

Case 3.—Miss J. K. had severe intermittent tic, with anæmia. At present, it was almost remittent. She had very severe pain all over the left side of the head, and some on the right side.

The pain was intense over the left eyebrow. The pupils were much dilated. She was first seen on December 10th, at 11.15 a.m., between which time and 4.30 p.m., three squares and a half were used (from half to two at a time) in each eye. At 6.45 p.m., she had no pain. At 8.30 p.m., I found she had had a very slight short pain about 7 p.m. Both pupils were still dilated. December 11th, pain returned at 3 a.m., and continued almost constantly until 1.30 p.m., when I used two drops of a solution of extract of Calabar bean (1 in 40) in the right eye (that being the side most affected). In fifteen minutes, the pain was much relieved. At 3 p.m., I found her asleep, but on awaking she felt slight pain on both sides of the head. I used two drops in the left eye and one in the right. In ten minutes, the pain was quite gone. At 9 p.m., she was sitting up, and felt quite well. From this time until December 26th, when I ceased attending, she could at any time stop the pain at once with the drops, which I found it convenient, however, to make of the strength of 1 in 32 afterwards. I treated her at the same time (from the 13th) with quinine and carbonate of iron, with decided benefit. I used the thermometer frequently in the armpit in this case, but observed no decided change of temperature attributable to the use of Calabar bean.

Case 4.—Miss T. had long standing tic, yielding to no treatment. It was only relieved by leaving Cupar for a time, and came back on her return. The pupils were generally much dilated, especially during an attack. I thought of using croton-chloral-hydrate in this case, but preferred the Calabar bean as being only local in action, as I think local remedies are always to be preferred for local diseases, when there is a choice. December 31st. When called, I found her suffering from intense pain over the eyebrows, mostly on the left side. I used two drops of a solution of 1 in 30 (partly lost) in the left eye, and one in the right. In about ten minutes, she said the pain was not quite so severe. I then used one drop more in each eye, with the effect of relieving still more, according to the patient's statement, the localised pain; but, on my return half an hour or so afterwards, I found her suffering from severe pain in the left eye, the pupils being contracted. The patient, being very reticent, had not mentioned to me that tic could be set up in the eye by even a drop of water getting into it, and even now said nothing to let me understand that the pain was that of tic (which unfortunately she was too well able to distinguish from other pains). Seeing the rather strong contraction of the pupils, I used at once one-third of an atropine square to counteract the effect of he Calabar bean, thinking the pain was caused by the contraction. The atropine acted only too well, evidently being assisted in its action by the tic, and the pain

immediately became more severe. The dimness of vision common after the use of atropine remained in this case for three or four days, and frightened her, she being rather hysterical, so that she refused to submit to further treatment.

Thus, in this case, the only one which has not been perfectly satisfactory in its results, although the patient was not really benefited by the use of the Calabar bean, the pain was, in the first place, according to her own statement, removed from its primary seat; and, even although set up in the eye by the cold drops, it was evidently kept in check by the action of the bean, until the latter was counteracted by that of the atropine. In such a case, outward application of the tincture (which I suggested, but the patient would not use it) or the use of strong Calabar bean, or physostigmatin squares would be advisable.

Case 5.—This was a case of obstruction of the nasal duct, complicated by tic, which was relieved in fifteen minutes by a little solution of Calabar bean (1 in 15) applied with a camel's hair brush. It returned in six hours, but was relieved in ten minutes by the bean. It caused the eye to become more injected than formerly. The tic did not return, and the obstruction of the duct ultimately required operative interference. The patient had been suffering from tic for two days continuously when I first saw her.

Case 6.—J. B., a man, had severe tic on the left side of the head. He was seen on March 16th, at 3 p.m. He had been suffering since early in the morning. This case being four miles from town, I used three squares and a half (they being in my pocket). In about ten minutes, there was almost total relief. In twenty minutes, two squares more relieved him entirely. The pain came on again during the night; but, having sent him a solution (1 in 30), he used a drop, and it relieved him immediately.

Case 7.—On May 4th, I had intensely severe tic over the right eyebrow, caused by want of sleep and wearing a tight hat all day. Having no stronger in the house, I had to use a solution of one grain to the drachm. Of this, two drops relieved me slightly; and two more in half an hour removed the pain entirely.

Case 8.—Mrs. W., on May 16th, had severe pain in the right side of the face, and was relieved in about half an hour by two drops (one first, then another) of a solution of 1 in 30.

Case 9.—July 22nd, 12.30 p.m. Mrs. P. had tic in the left side of the head and face. There had been severe pain since

3 a.m. I used a half-square (one-tenth of a grain of extract in each square). Relief was obtained in ten minutes. At 7.50 p.m., there was still a bruised feeling, "but no sharp pain." I used a half-square. The pain entirely ceased in ten minutes. —July 10th. The patient came back for more squares. This is the second patient who has done so.

Case 10.—Mrs. M. had severe tic in the left side, recurring every evening for a week past.—5.45 p.m. I used a half-square (as above). She was relieved in five minutes. At 6.30 p.m., she was free from pain, "though there was still a bruised feeling." Both these cases were afterwards permanently cured by quinine. In them, as also in myself and others in whom I have used the strong squares experimentally, the pupil always becomes *dilated* These squares are very hard, and this may account for such an action, as they irritate the eye for about two minutes when used. Squares containing physostigmatin, could they be obtained, would be much better.

Case 11.—J. A. had syphilitic paralysis of the right third nerve, probably from a tumour, with external strabismus, ptosis, dilatation of pupil, and neuralgic pains on the side of the face. I used one square on July 4th. The pain was slightly relieved. —July 5th. I applied one-tenth of a grain of the extract in the eye, causing congestion of the conjunctiva, relieving the pain, and producing contraction of the pupil. In this case, the fact that the pupil became *contracted* is very noteworthy, as the third nerve could not play its ordinary part. Possibly the congested state of the vessels may have acted as a cause of contraction.

In none of these cases did I observe decided contraction of the pupil, except in Cases 4 and 11. In Case 3, the pupil became smaller than usual, though never contracted to any great degree. In no case was vision interfered with by the Calabar bean—except slight temporary confusion in Case 3, lasting about two hours. In the experiment referred to in the first note, vision was temporarily confused (after six squares had been used), but the confusion soon passed away. No general symptoms were ever observed. I am quite hopeful that anyone giving Calabar bean a fair trial will find it an useful and safe immediate remedy for tic, leaving time, in cases requiring such treatment, for the use of quinine and iron, or other medicines calculated to have a permanent effect. For my own use, I intend to obtain, if possible, stronger gelatine squares, that being, in my opinion, the most convenient mode of application, being easily applied and certain in action. The idea is a very ingenious one, and does great credit to the inventor.—*British Medical Journal, Oct.* 31, 1874, *p.* 549.

19.—ON THE RELIEF OF TOOTHACHE BY BICARBONATE OF SODA.

By Dr. Dyce Duckworth, Assistant Physician to St. Bartholomew's Hospital.

I once read somewhere, but cannot now refer to the passage, that toothache might be relieved by holding solution of bicarbonate of soda in the mouth.

A very severe case in the person of a boy came before me lately, and an open molar tooth was the source of the trouble. I tried to afford relief by rubbing chloroform outside the cheek, and by putting some on cotton-wool inside the auditory meatus. These procedures failed. I next placed a plug of cotton similarly saturated into the cavity of the tooth. This also failed to give any relief. I was surprised at this, as I had frequently thus used chloroform with success.

I next saturated a small plug of cotton-wool with pure carbolic acid, and inserted this into the tooth-cavity. No abatement of the pain followed. I again tried chloroform, but in vain.

As a last resource I employed a solution of bicarbonate of soda, and to my astonishment the pain ceased almost suddenly, and complete relief was secured. I suppose I put about half a drachm into an ounce of water.

This solitary case seems worthy of record, as it may lead others to try the method adopted here. The remedy is within easy reach, and is very simple. It is difficult to offer an explanation of the *modus operandi* in the above case.

A mouthful of cold water will sometimes prove sufficient to remove the pain in toothache. I cannot now remember whether I tried this plan before using the solution of soda. Bicarbonate of soda is, however, a decidedly sedative remedy in certain conditions, and in proof of this may be mentioned the relief afforded by it in irritable conditions of the stomach, and in the itching of eczema.

It struck me as noteworthy that a somewhat feeble alkaline solution should produce so decided an effect after the application to the sensitive dentine of a powerful agent like carbolic acid. If the toothache is excited by unhealthy (acid) saliva, or buccal secretion, it becomes intelligible that an alkaline solution should rectify this.

In a future case I shall at once employ a *warm* solution of bicarbonate of soda, and thus I shall look for an unequivocal result. It would also be well to test the reaction of the saliva and of the buccal mucus in cases of toothache, with a view to ascertain their possible influence upon the surfaces of carious teeth.

The pathology of saliva is as yet, so far as I know, an uncultivated field, but I believe, if it be looked for, that this secretion will be more often found to possess an acid reaction than is generally believed or taught; and I also think that useful therapeutical hints may be gathered by the employment, at various intervals, of litmus paper in the mouth in many cases of dyspepsia and chronic disease.—*Practitioner*, *April* 1875, *p.* 260.

DISEASES OF THE ORGANS OF CIRCULATION.

20.—PERICARDITIS WITH EFFUSION; ASPIRATION OF PERICARDIUM.

By T. H. Bartleet, Esq., Surgeon to the General Hospital, Birmingham.

[A young man was suffering from pericarditis with considerable effusion. There was a considerably increased area of cardiac dulness and marked failure of pulse, also very rapid breathing.]

Cardiac dulness extended to one inch to the right of the sternum and to the upper border of the first rib above, though here the dulness was not complete. The limit of the dulness on the left side was uncertain, owing to effusion in the chest. On auscultation, the heart-sounds were very feeble and distant; no friction-sound. There was a faint mitral bruit. The character of the heart-sounds was not affected by posture. The impulse of the heart could not be felt, otherwise than as an ill-defined movement of the chest-wall at the region of the apex, spreading over a space the size of a crown-piece. The history of cardiac disorder at a former period suggested the possibility of pericardial adhesion.

At eight p.m. on Nov. 13th aspiration was performed. A No. 2 aspirator needle, unguarded, was used. This was passed in the intercostal space between the fourth and fifth ribs, two inches to the left of the central line of the sternum. The needle was used as an exhausted needle; and directly the pericardium was penetrated, as shown by fluid freely passing into the aspirator, the point of the needle was pressed up against the chest-wall as closely as possible. The fluid flowed freely to fourteen ounces, and then stopped flowing. It was deeply tinged with blood, and deposited speedily a scanty coagulum, and subsequently a layer of blood débris. The supernatant fluid, still somewhat tinged, had a specific gravity of 1024.

During the latter part of the operation it was noticed by all present that the needle could be felt when held by the finger to be moved with the contraction of the heart. The patient was

breathing deeply from pain or excitement, and thus prevented any cardiographic movements of the needle being *seen*. During and for half an hour after the operation the patient complained of severe aching pain. This ceased after a dose of fifteen minims of liq. opii. After the operation the line of dulness had receded to close upon the middle line of the sternum. The subclavian dulness had not disappeared, but was much less marked. Rapid recovery followed.—*Lancet*, *Dec.* 19, 1874, *p.* 866.

21.—DIGITALIS IN DISEASES OF THE HEART.

By Dr. H. C. Wood, Jun., Philadelphia, U.S.

"Digitalis in man, by its action on the inhibitory apparatus, prolongs the period of diastole, thus giving time to the ventricles to fill up with more blood than usual; and also increases the muscular power of the heart, so that when it contracts a greater volume of blood is thrown with a greater force into the arterial system. Before we begin to apply these principles remember also that the vascular system under the control of the vaso-motor nerves is probably kept in a state of contraction by the employment of digitalis.

"Almost nothing but common sense is needed now to apply these facts to the treatment of heart diseases. If what has been said is true, digitalis ought to be useful when there is a deficiency of heart-power. Remember that it is not a rag that will stop up a leak, and do not fall into the common error of expecting the drug to perform impossibilities. It cannot tighten a leaking valve; it cannot open and smooth down a contracted orifice. In other words, in valvular lesions it can only indirectly remedy the defects; and although you will get the most surprising results from its use, yet in every case of valvular lesion there comes, sooner or later, a stage when digitalis is powerless. It is when the valves are healthy and the cardiac failure is simply due to weakness of the muscular walls, that digitalis exerts its most wonderful powers. Nothing is more marvellous in clinical medicine than the relief you can sometimes rapidly afford in cases of simple dilatation of the heart."

After some illustrative cases, Dr. Wood goes on to describe the conditions characterising the dilated heart. Owing to its want of power, the circulation begins to fail, and all the tissues become in urgent want of more and better blood. The beats of the organ become rapid, irregular, and even more inefficient. Digitalis stays it, and gives it time to fill itself with blood and power to propel this through the system. The tissues are supplied, the lungs become cleared, and dyspnœa

abates. Never in these cases of rapid pulse with weak heart must aconite or veratrum be given, for, antagonists as they are to digitalis, they would in such cases act as poisons. In hypertrophy of the heart, however, when the whole frame may be shaken by its powerful impulse, digitalis may bring on a condition of spasm, and the patient may die from syncope due to a contracted heart. It is here that veratrum and aconite will prove of service. Irritable heart, again, induced in soldiers and others subject to excessive muscular strain, and usually having a tendency to dilatation, is greatly benefited by digitalis; but when, as in some instances, there is a tendency to hypertrophy, veratrum is indicated. In valvular disease accompanied by dilatation, digitalis is not so useful as in simple dilatation but by strengthening the muscle it is of service. The administration of digitalis in valvular disease accompanied by hypertrophy may seem to contradict the views expressed above; but here the point to be decided is whether there is or is not *relative* hypertrophy—*i.e.*, whether the increase is proportioned to the amount of extra work to be done. If it be not so, then the heart, although hypertrophied, is virtually as if dilated, and the use of digitalis is indicated. This is the criterion that should guide us in its administration. Practically, the minute diagnosis of the exact character of the valvular lesion is, in relation to the use of digitalis, of much less importance than a consideration of the condition of the system, Almost always when there are venous congestions and dropsies the heart is weak; and it is a practical rule, with very few (if any) exceptions, that cardiac general venous congestions and dropsies call for digitalis.

After describing the nature of mitral and aortic valvular, disease, Dr Wood goes on to say—

"In the earlier stages of cardiac disease, digitalis helps in effecting what may be called a cure. It is a mistake to suppose that the existence of valvular disease necessarily dooms a patient to a short life, or to one of suffering, or even of decided invalidism. If the disease commences before the age of nineteen it is very apt to terminate fatally before thirty; but if it is developed after puberty, the victim may enjoy a comfortable life of many years' duration. Nature cures valvular lesion by compensatory hypertrophy; and the rational aim of treatment is to aid nature in this, and, above all, to prevent the failure of cardiac strength that ends in cardiac dilatation. Digitalis will not only aid in averting dilatation, but will also aid very greatly in the production of hypertrophy."

We have not space for the explanation of the mode in which digitalis effects these purposes, but quote what Dr. Wood says regarding the administration of this drug:—

"Probably the infusion is the best form. If there is much dropsy, it may be given in the pill form, combined with squill, of each one grain three times a day. Of the tincture you can give five, ten, fifteen, or twenty drops every four, three, or two hours. In all cases you increase the dose gradually until some effect is attained; but you must do this very carefully, as digitalis is eliminated very slowly from the system, and sometimes, when it has been taken for a long time, a sudden poisonous effect results. Its effects, indeed, are always slow to show themselves, and they also subside very slowly, so that the medicine should be at once withdrawn temporarily when a decided influence is apparent. . . . . I do not want to impress you with the idea that digitalis is a dangerous drug. It has been given in doses of from a half to one ounce without any dangerous symptoms. The tincture has been given in these doses in the treatment of acute alcoholism; and the old school of therapeutists have been at their wits' ends why it did not kill the patient already suffering from the great nervous exhaustion of delirium tremens. They even suggested that the alcohol in the tincture counteracted the depressing effect of the drug. But what are a few drops of alcohol to a man who is in the habit of taking over a pint a day? And how could such small doses of the stimulant counteract the enormous dose of such a powerful sedative as digitalis has been supposed to be? Digitalis in these cases did not kill the patient, gentlemen, because it is not a cardiac sedative, but is a cardiac stimulant. Do not, therefore, be afraid of digitalis in valvular heart disease. Use it cautiously, but boldly; use it freely but judiciously: and you will find that it deserves even a better title than that of an 'opiate for the heart.'"—*Medical Times and Gazette, April* 3, 1875, *p.* 372.

DISEASES OF THE ORGANS OF RESPIRATION.

22.—ON THE USE OF DIGITALIS IN THE TREATMENT OF SOME CASES OF BRONCHITIS.

By Dr. JAMES BRAITHWAITE, Assistant-Surgeon to the Hospital for Women and Children, Leeds.

Given a patient past the meridian of life, either very stout, or emaciated from previous bad health, and let him, or more commonly her, have a neglected bronchitis, and we have the following class of symptoms produced: A perspiring skin, a poor and quick pulse, urgent dyspnœa, bluish tinge of lips and skin, and respiration accompanied by loud wheezing sounds. The most successful plan of treating these cases, so common during

the present severe winter, is the free administration of digitalis, which may be advantageously combined with the compound spirit of ammonia. The digitalis may be given in doses of ten minims of the tincture every two hours. In less urgent cases, the pills recommended by Dr. Fothergill, in his Hastings prize essay published in this Journal, are very useful, and have the advantage of less easily inducing sickness than the tincture. In these cases, it is the heart which is at fault, the right ventricle being gorged with blood, which it is unable to propel through the lungs. The best test of the truth of this theory is its success, for the pulse will be found to become full and slow, and the breathing relieved, directly the digitalis has had time to act on the heart. Its action is sometimes assisted by the judicious administration of a little alcohol. I prefer common gin. If, however, it be found that these cases of commonly called bronchitis are really dependent, for their non-recovery at least, upon weak hearts, care must be taken as to the administration of stimulants, for they accelerate the action of the heart, and in the end weaken it. In fact, digitalis slackens the speed, and stimulants increase it, so they to some extent contradict each other. I have had some cases lately in which twenty minims of tincture of digitalis were given every two hours for a whole day, and then decreased to ten minims every four or six hours. This medicine will be found to be chiefly valuable when the pulse is weak and rapid. In one old lady, about 80 years of age, the effect was remarkable, and in another, seen to-day, the pulse has fallen to 76, with corresponding relief to the other symptoms. In another case, in which the pulse was 130 and very weak, it acted magically, but I am sorry I made no note of the exact rate to which the pulse fell. Good support of all kinds may at the same time be given. I like stimulants less and less in this form of disease; if you want a horse to go one mile rapidly and well, the spurs may be used, but for a long journey a steady pace is better. Some patients are more susceptible of digitalis than others, therefore the effects must be watched, and the dose increased or diminished, as necessary.—*Brit. Med. Jour.*, *April* 10, 1875, *p.* 478.

DISEASES OF THE ORGANS OF DIGESTION.

23.—ON EXPLORATION OF THE ABDOMINAL CAVITY IN EXTREME CASES OF OBSTRUCTION OF THE BOWEL IN WHICH THE SEAT OF OBSTRUCTION IS UNKNOWN.

By T. Pridgin Teale, Esq., M.A., Surgeon to the General Infirmary at Leeds.

The case on which this essay is based is of interest as illustrating the advance which is being made in an important

department of surgery—"the surgery of the peritoneum." In a clinical essay (Lancet, May 2nd, 1874), on "Ovariotomy in Extremis," I spoke of the teachings of ovariotomy, and of the encouragement those teachings held out to a greater freedom in dealing surgically with the peritoneum, in conditions in which the patient has often been abandoned to his fate. These remarks had been anticipated in principle, and almost in words, by Mr. Thomas Smith in his paper "On some Points in the Surgical Treatment of Intra-peritoneal Injuries" (St. Bartholomew's Hospital Reports, vol. ix.)

The idea of opening the peritoneal cavity in order to determine the exact seat and cause of obstruction of the bowel, and as a preliminary step to further operation (in the present instance lumbar colotomy) has, I believe, been rarely carried out in practice, and still more rarely with success. It has, however, received encouragement from the case of *intussusception* recently published by Mr. Hutchinson, in which he rectified the invaginated bowel. If further experience should strengthen the growing surgical opinion in favour of greater boldness in opening the peritoneal cavity, we may look for as great an advance in the management of many obscure, and hitherto hopeless, cases of obstruction of the bowel as has taken place in the treatment of the once deemed hopeless cases of ovarian disease.

The following is the history of the patient, the subject of this paper, who was exhibited in good health and vigour at the meeting of the Leeds and West Riding Medico-Chirurgical Society, Oct. 2nd, 1874.

Joseph W., a butler, aged forty, first consulted me in October, 1873, on account of a very severe pain in the small of the back, from which he had suffered for two or three months. The pain was often distressing when he was moving about, but was most severe at night, frequently depriving him of rest. He also passed blood and mucus from the bowel, and his evacuations at this time were small and narrow. On examination I could not detect anything amiss with the rectum, which was of natural capacity, and free from any ulceration or tumour that could be detected by the finger. He was advised to rest at home from his work, and to use morphia suppositories. Under this treatment, aided by careful regulation of his diet, the evacuations became perfectly natural in appearance, form, and consistency, but the discharge of blood and the pain did not cease. Five weeks later he was seen by Mr. S. Hey and Mr. Oglesby, and a small tumour was felt near the left iliac fossa. He was then ordered to take small doses of Dover's powder, and to make further modifications of diet, the result of which was, that the discharge of blood gradually diminished,

and since Christmas last has not reappeared. At Christmas he resumed his work, though suffering at times as much as ever from the pain in the back. From Christmas to June he got on fairly well, easing his pain by suppositories and Dover's powders, and having a *solid, fully-formed evacuation* daily, free from blood and mucus.

In the middle of June the action of the bowels, which up to this date had continued to be perfectly natural, was suddenly arrested; aperients and enemata were of no avail, and the body became intensely tympanitic. At the end of ten days, during which no relief could be obtained, by the advice of his medical attendant, Mr. Atkinson, he was admitted under my care, at the Leeds Infirmary, on July 1st, 1874.

After his admission, he was treated by nutritive enemata and hypodermic injections, with a very small allowance of brandy-and-milk by the stomach.

At the end of four weeks from the commencement of the complete obstruction all hope of spontaneous resolution was abandoned. During the latter three or four days he had suffered excruciating pain, had lost flesh rapidly, and had several times been delirious; and it seemed as if, unrelieved, he could not possibly live more than three or four days. After several anxious consultations, my colleagues and myself came unanimously to the conclusion—(1) that the time had arrived when further delay would not be justifiable, and that an attempt ought to be made to relieve him by operation; (2) that no certain opinion could be formed as to the situation of the stricture; (3) that I should be justified in opening the abdominal cavity in order to search for the seat and the cause of the stricture, and to determine the possibility of relieving the obstruction by right or left lumbar colotomy.

Operation, July, 1874.—The patient being under the influence of chloroform, an incision was made in the middle line below the umbilicus, about five inches in length, which enabled me to introduce the hand between the distended intestines and the tense abdominal wall. The first points made out were the distended cæcum and the junction of the ileum with the colon. I then traced the ascending colon and the transverse colon, which latter, owing to its extreme distension, first descended to the pelvis and then doubled back and ascended in front of the left lumbar region to the left kidney, lying in front of and concealing the descending colon. Finally, below the crest of the ilium the distended bowel was felt to terminate in a hard mass of the size of a walnut, apparently attached to the bowel, and puckering it. It was clear, therefore, that left lumbar colotomy would give the relief desired. Five wire sutures were then introduced into the wound and tightened temporarily as far as

was deemed prudent, considering the tense state of the abdomen. The patient having been turned to a prone position, the usual operation of Amussat was performed in the left loin. The opening of the colon was followed by a large escape of flatus and of semi-fluid fæcal matter, which so far reduced the distension of the abdomen as to allow me to tighten up the wire sutures and effectually to close the wound in the front of the abdomen.

His progress after the operation was without a drawback. In a day or two he was able to take food almost ravenously, he rapidly gained flesh, and did not suffer the slightest discomfort or inconvenience from the abdominal wound. He is now (Oct. 3rd) better, stouter, and stronger than he has been for several months, and is anxious to resume his duties as butler. Four-fifths of his evacuations are passed per anum, and he has practically no inconvenience from the lumbar anus, except when his bowels are relaxed by purgatives. He still suffers great pain in the back, which is relieved by hypodermic injections twice a day. On examination of the body, a hard tumour of the size of a billiard-ball can be felt midway between the anterior superior spine of the ilium and the linea alba. For the first day or two large quantities of liquid fæcal matter escaped by the lumbar opening, and about the third day some solid scybalous matter was evacuated per anum, the passage of which was attended with very severe pain. By degrees more and more of the contents of the bowel escaped per anum, until at last not more than one-fifth passed through the lumbar opening.

Jan. 11th, 1875. He reported himself at the hospital to-day, looking remarkably well, and feeling stronger than he has done for twelve months. He has now resumed his duties as a butler. It is, however, to be feared that the original disease is gaining ground, as but little fæcal matter is evacuated per anum, and he has still much pain and bearing down at the rectum.

Remarks.—1. The question may fairly be asked—Seeing that a tumour could be felt in the neighbourhood of the sigmoid flexure, why was not colotomy performed in the left loin, without submitting the patient to the additional risk of opening the peritoneal cavity in order to search for the stricture? The reasons which influenced me, and with these reasons my colleagues agreed, were these:—(*a*) the absence of any evidence of stricture to be obtained by examination of the rectum, such as a tumour, or the dilated state of the lower bowel, so often found where there is stricture high up in the rectum; (*b*) the absence for many months of the discharge of blood and mucus from the anus; (*c*) the absence of chronic diarrhœa; (*d*) the

fact that for many months, and even *up to the very date* of the obstruction, the evacuations had been perfectly natural in *size, form, and consistence.* Further, the risk incurred in opening the peritoneal cavity for the purpose of search did not seem to be great nor equal to the risk involved in performing lumbar colotomy when in doubt as to the site of the stricture.

2. Ovariotomy has taught us that a peritoneum altered by recent or remote inflammation can bear exposure, handling, and cleansing in a manner truly astonishing. In this case, however, we had a healthy peritoneum. My confidence as to the impunity with which a healthy peritoneal cavity could be opened and explored rested mainly on this—viz., the recollection of the frequent occasions in which, in strangulated hernia, a healthy peritoneal cavity is opened, and several inches and even coils of intestine are handled and sponged, and are manipulated and returned into the abdominal cavity without the occurrence of any unfavourable consequences. This confidence was strengthened by the belief that one great cause of peritonitis after ovariotomy is the presence of blood which either escapes into the peritoneal cavity after the completion of the operation or has been left behind by the operator.—*Lancet, March* 13, 1875, *p.* 369.

24.—ON ABDOMINAL SECTION FOR INTUSSUSCEPTION.

By Jonathan Hutchinson, Esq., Senior Surgeon to the London Hospital; Surgeon to Moorfields Ophthalmic Hospital, and to the Hospital for Skin Diseases.

[Mr. Hutchinson relates an interesting case in which abdominal section was successfully performed for the relief of intussusception. A portion of the bowel protruded from the anus, and was recognised as the cæcum.]

The child having been taken up into the operation theatre, chloroform was again administered, and I then opened the abdomen in the median line below the umbilicus, and to an extent admitting of the easy introduction of two or three fingers. I now very readily drew out, at the wound, the intussuscepted mass, which was about six inches long. I found that the serous surfaces did not adhere, and that there was no difficulty whatever in drawing the intussuscepted part out of that into which it had passed. Just as the reduction was finished the appendix cœci made its appearance, confirming the opinion which had been formed as to the precise part of the bowel involved. The opposed serous surfaces did not present a single flake of lymph, and they were congested in only a moderate degree.

Having completed the reduction, I put the bowel back into the abdomen, and closed the wound with harelip pins and interrupted sutures.

The operation had been an extremely simple one, and had not occupied more than two or three minutes.

The after-treatment consisted in the use of milk enemata every three hours, with the occasional addition of five minims of tincture of opium.

No vomiting occurred after the operation.

Nothing but fluid food (milk and beef tea) had been allowed through the greater part of this time from a fear of producing any return of the intussusception. The child was fitted with an abdominal support when discharged, but the scar was sound and strong, and there was no tendency to bulging.

[Mr. Hutchinson then proceeds to review a number of other cases which are on record—the earliest of which occurred so long ago as 1784, and then sums up with the following conclusions:]

1. That it is by no means very uncommon for intussusception to begin at the ilio-cæcal valve, and to progress to such a length that the invaginated part is within reach from the anal orifice or even extruded.

2. That it is of great importance in all cases of suspected intussusception to examine carefully by the anus.

3. That in almost all cases of intussusception in children, and probably most in adults, the diagnosis may be made certain by handling the invaginated part through the abdominal wall.

4. That the prognosis of cases of intussusception varies much; first in ratio with the age of the patient; and, secondly, with the tightness of the constriction.

5. That in a large proportion of the cases in which children under one year are the patients, death must be expected within from one to six days from the commencement.

6. That in the fatal cases death is usually caused by shock or by collapse from irritation and not by peritonitis.

7. That in many cases it is easy, by estimating the severity of the symptoms (vomiting, constipation, &c.), to form an opinion as to whether the intestine is strangulated or simply irreducible.

8. That in cases of strangulated intussusception, whilst there is great risk of speedy death, there is also some hope that gangrene may be produced and spontaneous cure result.

9. That in cases in which the intussuscepted part is incarcerated and not strangulated, there is very little hope of the

occurrence of gangrene, and it is probable that the patient will die, after some weeks or months, worn out by irritation and pain.

10. That the chances of successful treatment, whether by the use of bougies or by the injection of air or water, are exceedingly small, excepting in quite recent cases, and that if the surgeon does not succeed by them promptly it is not likely that he will succeed at all.

11. That the cases best suited for operation are those which have persisted for some considerable time, and in which the intestine is only incarcerated, and that these cases are also precisely those least likely to be relieved by any other method.

12. That in the cases just referred to, after failure by injections, bougies, &c., an operation is to be strongly recommended.

13. That the records of post-mortems justify the belief that, in a considerable portion of the cases referred to, the surgeon will encounter no material difficulty in effecting reduction after opening the abdomen.

14. That the circumstances which might cause difficulty are, first, the tightness of the impaction of the parts, secondly, the existence of adhesions; and thirdly, the presence of gangrene.

15. That in selecting cases suitable for operation the surgeon should be guided by the severity of the symptoms, in his estimate of the tightness of the strangulation, and also as to the probability of gangrene having already set in.

16. That in cases in which the patient's symptoms are very severe, or the stage greatly advanced, it may be wiser to decline the operation and trust to the use of opiates.

17. That the operation is best performed by an incision in the median line below the umbilicus.

18. That in cases of intussusception in young infants (under one year of age) the prognosis is very desperate, scarcely any recovering excepting the few in whom injection treatment is immediately successful, whilst a large majority die very quickly.

19. That the fact just referred to may be held to justify, in the case of young infants, very early resort to the operation.

20. That it is very desirable that all who in the future have the opportunity for post-mortem examination of intussusception cases should give special attention to the question as to whether an operation would have been practicable, and should record their results.—*Medico-Chirurgical Transactions, vol.* 57, 1874, *p.* 31.

DISEASES OF THE URINARY ORGANS.

25.—ON DIABETES.

By Dr. ANDRAL, Member of the Institute of France, and of the Academy of Medicine, Paris.

M. Andral, whose investigations early in the present century gave so powerful an impulse to physiological chemistry, which has since made such rapid strides, will, to most of our readers, seem to be springing from the tomb, so close has his retirement been for many years past. All who are aware of the careful and conscientious work he did in his day will rejoice, even thus late, at another contribution from his pen. Finding diabetes to have become almost, so to say, a topic of the day, he has communicated to the Académie des Sciences an analysis of eighty-four cases, of which he has preserved written accounts, discarding all others which he had trusted only to memory.

Of these 84 cases, 2 at the period of observation were between the ages of three and five, 3 between ten and twenty, 12 between twenty and thirty, 20 between thirty and forty, 20 between forty and fifty, 13 between fifty and sixty, 12 between sixty and seventy, 1 at seventy-three, and 1 at seventy-eight. Thus, glucosuria, very rare prior to twenty, becomes less so between twenty and thirty, is at its maximum between forty and fifty, and continues to be often met with between fifty and seventy, after which it becomes quite exceptional; that is, the greatest frequency of the disease coincides with the epoch at which the organic forces are in greatest activity. But the ages thus specified were not those at which the diabetes first made its appearance—which were in 12 before thirty, in 40 between thirty and sixty, and in 8 between sixty and eighty. There were 52 males to 32 females.

Several of these cases exhibited the influence of the nervous system in producing or aggravating the disease. Thus, under some moral emotion the quantity of sugar would become augmented in the course of the twenty-four hours from twenty grammes to ninety-six grammes per litre; and in some very rare cases the first manifestation of diabetes followed closely upon the operation of such cause. One woman became diabetic after having inspired so large a quantity of ether during several months that she was often in a kind of intoxication; and in another the diabetes followed disturbances of the sensibility, which exhibited themselves in the forms of partial anæsthesia, and multiple neuralgias. One man was epileptic and another paraplegic before becoming diabetic. In two cases a traumatic lesion preceded the glucosuria, the lower part of the occiput in

one case and the nucha in the other being the seat of injury. In three cases there was paralysis of the upper limbs without any alteration in the sensibility.

M. Andral has been able to trace the diabetes to defective nutrition in but very few cases, and he observes that "during the many years that I have attended persons of all classes of society in and out of hospitals, I have met with a larger number of cases among the well-to-do than among the poor. Now, the food constitutes one of the differences between these two classes, being often insufficient and in great part vegetable in the latter, and in the other proportioned to the wants of the economy, and often exceeding these, and in great part animal in its nature. I have also found more than once that persons, before they become diabetic, were remarkable on account of the strength of their constitution, some of them having much *embonpoint*. Whatever, then, may be the intimate disturbance which induces —first in the blood, and consecutively in the urine—an excess of sugar, it would seem, in more than one case at least, that this hyperglycæmia and this glucosuria, so far from representing a diminution of nutritive activity, may manifest an exaggeration of this. This idea, which is Prof. Claude Bernard's, is supported by another remarkable fact—viz., the disappearance of the sugar from the urine in the last stage of the existence of diabetic persons, as I have been able to assure myself more than once."

Other disturbances than that of the nervous system may precede diabetes; and thus, although in most of the 84 cases the diabetes manifested itself in the midst of good health, yet in 3 subjects it had been preceded by dyspepsia, in 8 by phthisis, in 5 by asthma, in 3 by organic disease of the heart, in 2 by nephritic colic, in 3 by typhoid fever, and in one by cholera. When diabetes becomes complicated by another disease, it may temporarily disappear, as was the case with a man as long as he was suffering from febrile angina, and with a woman the subject of severe dysentery. Was the cause here the modification of the nutritive action during fever, or the suspension of alimentation?

As is well known, the urine is of greater density in diabetes than in any other disease. Whenever it contained more than twenty grammes per litre, the areometer has always marked more than 1030, standing in a great number of cases between 1032 and 1038, and often between this last figure and 1042. In fever cases it has been between 1042 and 1045, and once it marked 1047—the maximum observed. As the result of comparative observations, it may be concluded that wherever it is of a higher density than 1036, glucosuria exists. The amount of sugar in the eighty-four cases has varied from 6 to 100

grammes per litre; and as these patients discharged several litres in the twenty-four hours (in one of them 480 grammes of sugar, in another 720, and in a third 800 grammes were so expelled), it is evident that, in such cases as these, it cannot be only feculent alimentary substances that furnish such an amount of glucose. Moreover, successions of analyses have shown that, irrespective of the influence of all treatment, the quantity of sugar may greatly vary at closely approaching epochs, and that it may alternately disappear and return. It is under this last circumstance especially that it comes to pass that glucosuria may persist for a great number of years without serious damage to the health, while in other cases diabetes runs almost the course of an acute disease. M. Andral has known it prove fatal in scarcely five weeks after its first appearance.

The general circulation, except when complications existed, has not been notably disturbed, the pulse generally ranging from 60 to 80, and never having been less than 56. But, on the other hand, the capillary circulation has often suffered, as exhibited in red and swollen gums, injected conjunctivæ, erythematous patches of the skin, and passive congestion of the lungs—a frequent cause of death in diabetes. "Can I venture to attribute all these congestions to the sort of difficulty which the blood, loaded with sugar, may find in traversing the capillaries, or do they depend upon defective action of the vaso-motor nerves? And, after all, are they other than hypotheses, these expressions of too thick or too fluid blood, by which formerly so many morbid conditions were too easily explained without sufficient proof? And if I put the question, it is because it seems to me accessible to the combined researches of clinical medicine, experimental physiology, and chemistry. And if an affirmative conclusion be determined upon, we must arrive at this conclusion: that there is an order of hyperæmias which finds its explanation in the blood itself."

In the diabetic subjects upon whom autopsies have been performed, most marked congestion of the liver and kidney has always been found, which M. Andral regards as a consecutive result of the excessive functional activity of these organs. Two other facts, which have been also observed in most of the cases, have much struck him. One of these was a singular induration of the spleen, its parenchyma being so dried up that not a drop of liquid followed incision and pressure. The other was the appearance of commencing tubercular granulations in the pulmonary parenchyma, their slight development probably indicating that they had been developed subsequently to the glucosuria, under the influence of the debility consequent on this.

The treatment generally followed in these eighty-four cases consisted in the use of alkaline drinks and in alimentary regimen

composed chiefly but not exclusively of animal substances, to which were added some herbaceous vegetables and ordinary bread. During this treatment the sugar disappeared not to return again in only five cases. In some others it also disappeared but to return again; while in others it remained as abundant as before, or even increased. In these last cases an exclusively animal regimen, unaccompanied by any feculents whatever, was rigidly enforced, and yet the sugar continued to appear. Moreover, this regimen cannot be continued indefinitely, for after a time the patients become so disgusted with it, that, whether we will or not, we must give it up.

M. Andral terminates his paper with some considerations as to how far his clinical experience corroborates the theory of diabetes founded by M. Claude Bernard on the results of experiments. He is of opinion that this is the case only to a very limited extent.—*Medical Times and Gazette, April* 24, 1875, *p.* 450.

26.—BENZOIC ACID IN AMMONIACAL CYSTITIS.

By Professor Gosselin and Dr. A. Robin.

In the Medical Times and Gazette of February 7, 1874, page 163, appeared a paper presented to the Académie des Sciences by Prof. Gosselin and Dr. A. Robin on the treatment of ammoniacal urine by benzoic acid. Since then they have published an extended memoir upon the production and effects of ammoniacal urine in the Archives Générales for May and June, in which they go fully into the history of the subject, and detail a great number of experiments which they have performed. In another memoir, in the number of the Archives for November, they enter at full length upon the treatment of the cystitis which they have found to be induced by ammoniacal urine.

"In the case of a solution of continuity of the vesico-urethral mucous membrane, the patient is exposed to all the dangers of a general intoxication. It may determine local complications resulting from the immediate action of the urine on the divided tissues, giving to the urinary infiltration quite a character of special gravity. On the other hand, whether a wound of tissue be superadded or not, this condition may be the cause of well-known effects of a different nature from the preceding. There is first the constant irritation of the mucous membrane of the bladder by this urine, whence comes an abundant secretion of mucus, which favours the decomposition of the urea. This irritation, more or less prolonged, may end in a more or less intense cystitis, which in all cases has a remarkable tendency to become chronic. Another result not less important is that the ammoniacal condition favours the forma-

tion of ammoniaco-magnesian phosphatic calculi; for, as Prof. Robin has shown that, as the phosphates play an important part in the economy by reason of their property of combining with ammonia—which they fix and saturate,—so, in the various humours and in the urine, they seize the ammonia as it is formed. Unfortunately, the ammoniaco-magnesian phosphate is insoluble."

The problem is to saturate the carbonate of ammonia of the urine without employing substances which may form insoluble salts, or such as are possessed of poisonous qualities. In this way we may be able to prevent, at least in part, the local and general accidents which are due to the absorption of ammoniacal urine and to the contact of this with divided tissues. In any case such neutralisation would serve as a powerful adjuvant to the treatment ordinarily employed in diseases of the urinary organs. Carbonate of ammonia is a very alkaline salt, being almost a base by reason of the facility with which its carbonic acid is displaced, and our object is to select among the acids such of them as are best qualified to meet the object mentioned above. The authors, after passing in review the objections which exist to the employment of the various other acids which have been resorted to for this purpose, come to the conclusion that benzoic acid, formerly recommended by Alexander Ure, is the only one which meets the contingency. This is rapidly transformed into hippuric acid, and exerts no ill effect upon the economy, persons both in health and ill being able to take from two six grammes per diem without detriment. Hippuric acid, thus formed, increases the acidity of normal urine, and in ammoniacal urine prevents the formation of phosphatic deposits by combining with the ammonia, which without it would have formed with the phosphate of magnesia contained in the urine an insoluble ammoniaco-magnesian phosphate. The hippurates in general, and especially the hippurate of ammonia, are very soluble. Benzoic acid is very slightly soluble in cold water, which constitutes one of the difficulties of its employment; but it may be given in suspension in mucilaginous or syrupy mixtures. A formula is—Benzoic acid, 1 to 3 parts; neutral glycerine, 4 to 6 parts; and mucilaginous mixture, 150 parts. As a general rule, only one gramme (fifteen grains) per diem should be given at first, this quantity being rapidly increased to three or four grammes. To many patients as much as six grammes may be given, providing this quantity be not persisted in for too long a time, as indicated by dryness and a sense of smarting in the pharynx. The production of acidity or neutralisation of the urine does not take place at once, the extreme limits of time which have been observed being from five to nineteen

days, the mean period being from seven to eight days. This effect is announced by the diminution of phosphatic deposits, pus, and blood, and by a modification in the odour of the urine, the fetidity of which is gradually lost.

Four well-marked cases are given, and the authors appropriately reprint an interesting case related thirty years since by Alexander Ure, in his paper "On the Treatment of Phosphatic Deposition," published in the Provincial Medical and Surgical Journal, February 11, 1843, and "*Braithwaite's Retrospect*," vol. vii. The following are the conclusions of Prof. Gosselin and M. Robin's memoir:—

"1. The ammoniacal condition entering in part into the production of the accidents which supervene after operations on the urinary organs, it is highly desirable to prevent or diminish it. 2. Benzoic acid and the balsams which contain it, and probably other vegetable productions (as salicine, cinnamic acid, &c.), conduce to this result. 3. The hippuric acid which is produced acts in several ways—(1) By forming a hippurate of ammonia which is less poisonous than the carbonate. (2.) By retarding the decomposition of the urine, and the consequent production of the carbonate. (3.) By preventing the formation of insoluble phosphatic deposits, which are a cause of cystitis, and may become the point of departure of calculi. 4. The administration of benzoic acid should be recommended for the subjects of ammoniaco-purulent cystitis, and especially those of them who have to undergo operations on the urinary organs."—*Medical Times and Gazette, Nov.* 28, 1874, *p.* 613.

27.—ON A SIMPLE PROCESS FOR ESTIMATING UREA IN URINE.

By W. J. Russell, Ph.D., F.R.S., and Samuel Watson, B.A. Oxon, Radcliffe Travelling Fellow.

With the exception of the yeast process for the estimation of sugar, there has been up to the present time no accurate method adapted for clinical use by which it was possible to make quantitative determinations of the various constituents in the urine. Of the normal constituents urea is by far the most important; yet Liebig's method, which is that commonly used for its estimation, is so lengthy and elaborate as practically to be useless for clinical purposes.

The method we are about to describe in this paper is based upon a chemical reaction which has been long known, but which has not hitherto been available for general use, on account of the elaborate calculations which had to be made with every experiment. With the present form of apparatus these diffi-

culties have been overcome, and accurate results can be obtained by it in a very few minutes. The apparatus is, moreover, easy to use and inexpensive, and its various parts can, if broken, be replaced separately at a very slight cost. (It is sold by Messrs. Cetti, Brook Street, Holborn, price 8s. 6d.)

Urea, as was first shown by Dr Davy, is decomposed by hypochlorous or hypobromous acid in the following manner:—

$$NH^4CNO + 3\,ClHO = 3\,HCl + 2\,H^2O + CO^2 + N^2$$

that is to say, it is split up into water, carbonic acid, and nitrogen. If the carbonic acid be now absorbed by passing it through a solution of caustic soda, the gas evolved will be nitrogen alone. Davy proposed to measure this nitrogen, and from it to determine the quantity of urea which had been decomposed according to the formula:

60 parts by weight of urea = 28 parts by weight of nitrogen.

The decomposition is not quite so complete in reality as he stated. Sixty parts of urea by weight really produce only about 26 parts by weight of nitrogen; that is to say, there is a loss of about 8 per cent. The importance of this loss of nitrogen we shall refer to later.

The reagent employed is a solution of hypobromite of soda in considerable excess of caustic soda; and the most convenient strength of solution is found to be that prepared by dissolving 100 grammes ($3\frac{1}{2}$ ozs.) of caustic soda in 250 c. c. (9 ozs.) of water, and adding to this, when cold, 25 c. c. (7 drachms) of bromine.

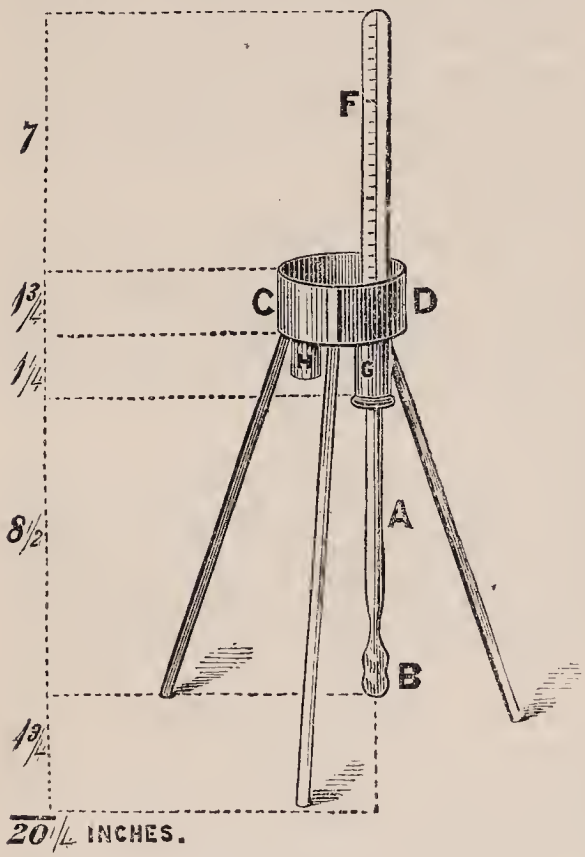
The solution unfortunately decomposes if kept for some little time, and it is safer to make it in small quantities as it is required. This may be easily and quickly done by keeping in stock a solution of caustic soda of the necessary strength, and adding to a portion of this the requisite quantity of bromine at the time the experiment is made.

The apparatus, the form of which is shown in the accompanying sketch, consists essentially of three parts—a tube, A, in which the reaction takes place; a measuring tube, F, to collect the gas produced; and a small pneumatic trough, C D.

The tube A, about 9 inches long, is narrowed two inches from the closed end, and a bulb, B, holding about 12 c. c., blown on it. The upper part of the tube contains about 25 c. c. This is fitted, by means of an india-rubber cork, into the small elliptic tin trough, C D, about three inches long, standing upon three legs. In using the apparatus, a 5 c. c. pipette is filled with the urine, and the liquid is allowed to flow into the bulb of this tube. Water is added, thus washing down the urine which adheres to the sides of the tube, and filling the bulb up to the top of the constriction. A glass rod, with a piece of india-rubber

tubing about half an inch long drawn over the end of it, then is introduced, so that the india-rubber plugs up the constriction. The hypobromite solution is then poured into the upper part of the tube until it is full, and the trough is afterwards half-filled with ordinary water.

The graduated tube, F, is filled with water, the thumb placed on the open end, and the tube is inverted in the trough. The glass rod is then pulled out, and the graduated tube slipped over the mouth of the bulb-tube.



The reaction commences immediately, and a torrent of gas rises into the measuring tube. With the strength of hypobromite solution which we suggest, the reaction is complete in the cold in about ten or fifteen minutes; but in order to expedite it, the bulb is slightly warmed. This causes the mixing to take place more rapidly, and the reaction is then complete in five minutes. The reaction will be rapid and complete only when there is considerable excess of the hypobromite present. After the reaction the liquid should still have the characteristic colour of the hypobromite solution.

The simplest means of supporting the measuring tube is to have the bulb-tube corked into a well, G, which projects from the bottom of the trough about one inch downwards. The graduated tube stands over the bulb-tube, is supported by it, and rests upon the cork in the bottom of the well. It is convenient to have at the other end of the trough another well, H, which will form a support for the measuring tube when not in use.

The gas collected is nitrogen saturated with aqueous vapour, and the bulk will obviously be more or less affected by temperature and pressure.

It has hitherto been necessary to make correction by calculations of some intricacy for the variations in the bulk of gas which these produce; but with the present form of apparatus it is found that these corrections may be avoided, and the volume

of gas read off at once without calculation, The reason of this is the following:—When urea is decomposed by hypobromous acid, the whole of the nitrogen, as stated above, is not given off, but there is a loss of 8 per cent. at 60° Fahr., which is about the ordinary temperature of wards; however, the increase in the bulk of gas caused by the temperature, moisture, and pressure, amount exactly to 8 per cent.; that is to say, the increase due to these causes exactly equals the loss of nitrogen due to the incomplete decomposition. In other words, if we make no correction at all, we get exactly the quantity of gas we ought to have. Hence all calculations are avoided.

The measuring tube has upon it the figures i., ii., iii. These mean 1, 2, 3 grammes of urea in 100 c. c. of urine; *i.e.* 1, 2, 3 per cent., as it may be called; so that if after experiment the level of the gas stands opposite ii. on the tube, the urine experimented upon contains two per cent of urea.

Sugar does not interfere with the reaction and albumen only so far that the bubbles of gas take so long to subside. It is advisable therefore to remove the albumen by boiling quickly with a few drops of acetic acid, and to filter. 5 c. c. of the filtrate is then taken and estimated as above.

For further information as to the theory and practical working of the apparatus, reference may be made to the original paper read before the Chemical Society, and published in that Society's Journal for August 1874.—*Practitioner*, *Feb.* 1875, *p.* 86.

SURGERY.

AMPUTATIONS, FRACTURES, DISLOCATIONS, AND DISEASES OF BONES, JOINTS, &c.

28.—AMPUTATION THROUGH JOINTS WITHOUT INTERFERING WITH THE PROXIMAL BONE, AND REMARKS ON THE DRESSING OF STUMPS.

By Dr. George H. B. Macleod, F.R.S.E., Surgeon to the Royal Infirmary of Glasgow.

Amputation through joints has long been a recognised method of operation, and the object of the following communication is to advocate a modification of the usual practice, viz., to leave, in every case in which it can be done, the proximal bone with its incrusting cartilage untouched in the stump.

It is doubtless well known that for a long time a very great prejudice existed against amputation at joints, founded chiefly on the recognised danger which attends "wounds" of articulations. The fear was great of exposing cartilage and fibrous tissue to the air, or interfering in any way with these structures. Tetanus, diffuse suppuration, phlebitis, and purulent poisoning were said especially to attack such cases, and thus, amputation in the continuity of the limb was performed in preference to that in the contiguity or at a joint. Even in those instances in which the saw was not applied, the ancients appear to have used the actual cautery to destroy the cartilages rather than leave them exposed in the wound. In more recent times again, the opinion has prevailed that proper adhesion would not take place between a surface covered with cartilage and the soft parts laid over it; that the suppuration would be rendered far more profuse by the presence of the cartilage, which it was thought must exfoliate before the stump could heal. Those among us, however, who have had much operative experience, and whose attention has been directed to the fact, must have seen many cases in which the incrusting cartilage of a bone has behaved in no such injurious way, but, on the contrary, has given no trouble whatever.

The writer's attention was first forcibly drawn to the action of healthy cartilage in stumps when serving as surgeon to the General Hospital in camp before Sebastopol, and he has referred

to the fact in his work on the surgery of the war. In several cases of amputation through the larger joints he did not touch the cartilage, and the results were such as very strongly to show him not only that the fear which many had expressed regarding the consequences was unfounded, but also with the indubitable advantages attained. In civil practice these observations have been extended and confirmed. Of course, the instances in which the practice alluded to can be pursued are not very numerous, *i.e.*, the cases in which it can be fairly carried out bear a comparatively small proportion to those in which it is not applicable, yet, in the public practice of a large city, it is by no means uncommon for injuries (by railway and other wheels and by machinery), so completely to destroy the distal bone as to demand its removal, and yet to leave the end of the proximal bone unhurt. It is perhaps at the knee that we most often have to deal with this state of affairs. The chief difficulty then is to obtain sufficient covering, but by sacrificing no tissue, and not allowing ourselves to be restricted to the usual classical methods of amputating, we frequently succeed almost against hope.

To constitute a good "method" of amputating the chief requirements evidently are—thoroughly to remove what is destroyed or diseased; to retain as much of the body as possible, *i.e.*, to keep as far as we can from the trunk, and so diminish the risk of the operation; to obtain sufficient covering, and that of a kind which will form a good stump (muscle to cover bone, and skin to cover muscle); to fashion our flaps so that they will readily fall into and retain their place; to provide good drainage; and to place the blood-vessels and nerves, and also the cicatrix, out of the way of pressure. If to this we add that, other things being equal, we should as far as possible aid the mechanist in securing a good point of attachment for a false limb, all those conditions will have been enumerated which influence the surgeon in deciding on any special plan of operating. The decided preference manifested in our day for long anterior and short posterior flaps (mainly promoted by Sedillot, Baudans, Lisfranc, Teale, and Spence), is the best evidence of how strongly these views have attracted the attention of the profession. Such methods of amputating allow us to elevate the end of stumps without harm, and, in some cases, this is an important consideration. Now, in amputating through any of the joints we are able in a great degree accurately to fulfil the requirements to which allusion has been made. At the shoulder, Lisfranc's method of cutting a postero-external large flap does so very completely. At the hip the ordinary large anterior flap falls down like a cap over the joint. Cardens and Teales at the knee give perfect results. Syme

again reverses the relationship of the long and short flaps at the ankle to attain very obvious and good ends, but here, too, we now restrict very greatly the size of the heel flap, so as to diminish the hollow which it otherwise forms, and, by keeping the angles free, we are able to secure the most complete drainage. Baudans' amputation, in which the long flap is taken from the front of the instep (and would thus in some respects more perfectly fulfil the conditions laid down), provides such bad tissue for covering the stump that it must be rejected. At the elbow, Dupuytren's plan of securing a long flap from the back of the joint and cutting the tissues short in front, is more in keeping with modern practice than the reverse method which is occasionally adopted. At the wrist, the writer strongly advocates Dubruils' device of using the coverings of the thumb for a flap, as nothing could be more satisfactory than the results it has afforded him. In amputating fingers and toes at their phalangeal joints, the dorsal long flap carries out the system advocated, while the oval plan is so perfect, when employed at the higher articulations, as to leave nothing to be desired.

Now, in a considerable proportion of traumatic amputations, and in a larger number of operations for disease at joints, than, theoretically, one would be apt to suppose, the articular end of the proximal bone can be left wholly uninterfered with, as its cartilage is sound and will live and protect the bone. Of course this is not a question which has any bearing on those cases in which amputation can be performed below a joint (though, if the choice lay between operating through the head of the distal bone, and through the joint immediately above, the writer would unhesitatingly remove the limb at the joint, with the reservation of not touching the proximal bone, believing, as he does, that the risk is much less), but the main question he wishes to allude to is that in those cases in which we have the choice of amputating through the joint, or in the bone close *above it*, it is best to choose the former.

By employing such cap-like flaps, as have been referred to above, and in no way interfering with the cartilage or bone, the writer is satisfied that better results *in every way* will be obtained, than by following the almost universal habit of sawing off the articulating surface, or at all events paring off the cartilage. Of course it is only in cases where the incrusting cartilage appears to be altogether sound that such a practice as is here advocated would be thought of.

The objections which can be urged to the proceedings alluded to are—

1st. The risk of the bone below the cartilage being diseased, though the cartilage itself appears sound.

2nd. The difficulty of getting covering for so large a surface as the expanded end of the proximal bone usually is.

3rd. The alleged slowness of cicatrisation, and the difficulty of obtaining adhesion between the flaps and the cartilage.

4th. The supposed increased suppuration; and

5th. The injurious influence which is said to attend the leaving of shreds of synovial membrane within the flaps.

Now, with regard to these so-called objections, the writer would observe, that by careful attention we can always judge whether the bone is sound, and, if it is diseased, we should do better to remove the cartilage alone, and gouge away any affected portion of bone rather than saw off an entire section as is generally done. Of course, if the disease is too extensive for this, then the case is not one to which the plan here described is at all applicable.

As to the coverings, they are too often condemned, simply because they are thickened and apparently changed to the eye, and the operator removes them, having failed to observe how often these structures resume their healthy character whenever the source of irritation has been taken away. In many cases we must take care to sacrifice nothing, and to endeavour to retain as much breadth of flap as possible, and to provide amply for the retraction of such muscles as are known greatly to shorten after they are cut. As regards delayed cicatrisation, failure to adhere, necessary exfoliation of the cartilage, increased suppuration, and the injurious influence of shreds of synovial tissue in the wound, the writer has had ample experience to prove to him their utter groundlessness as objections to the proceeding he has described. In fact, bones covered with sound cartilage cause vastly less irritation, and consequently less suppuration than sawn bones; and it is extremely rare for any portion of the cartilage which has been covered up by a flap to die or be thrown off. If any detrites of synovial membrane, which appears to be diseased, is seen between the flaps, it can easily be removed at the time of the operation.

The advantages which attend amputation in the contiguity and non-interference with the proximal bone, may be thus shortly stated:—

Exarticulation is quicker, easier, requires simpler instruments, and is attended with far less bleeding (from our having to deal, as a rule, with the main arterial trunk), than amputation in the continuity. By not touching the cartilage we can keep further from the trunk, have a longer stump, and not expose the very vascular and, hence, very absorbent end of the long proximal bone.

There are here very great and important benefits which need not be enlarged upon. The risks of septicæmia and ostio-myelitis are reduced to the lowest attainable point as the bone (the chief agent of absorption in stumps) remains sealed. Operations thus performed are attended with much less shock —the integuments preserved are, as a rule, those best fitted for withstanding pressure—there is vastly less risk of injury to the flaps and blood-vessels and nerves by the action of the unsawn bone acting on them, and hence we need not fear protrusion or pain subsequently—we are less apt to be troubled by the retraction of the muscles, as their close adhesion to the bone down to its end is not weakened—the power of sustaining the pressure of apparatus is much earlier acquired, and the point of support is broader and better fitted for pressure than when the bone has been divided. If to this we add that the anastomosis of the blood-vessels in such flaps is very quickly established from the large supply of twigs on the level with joints—that we have no bleeding from the bone to deal with or dread, and that a false limb can with perfect success be fitted so as to retain the joint motion with a stump of the natural length, all the leading advantages of the mode of operating dealt with will have been stated, and it must be allowed that such advantages are neither few nor inconsiderable.

Of course, we cannot amputate through a joint the seat of malignant disease; but it is in secondary amputations for accident that the most marked good is obtained, and it is in such cases that the great dangers of septicæmia and ostio-myelitis are apt to arise.

It may be further added that the redundant size of the articulating head of the bone, which is in some cases left in the stump, in time disappears, and it becomes beautifully rounded and well adapted for the end of the stump.

It is the writer's wish to append a very few remarks on the dressing of stumps, as for years he has clinically tried nearly all the various ways described by our leading surgeons. The best results have always been got from the simplest plans, always supposing care had been taken in the formation of the flaps. A few deeply placed and firmly fixed metallic sutures should be used to fix the flaps and keep them from moving about; "sutures of reserve" may be inserted with advantage at the time of the operation to bring together other portions of the coverings afterwards, when the suppuration has ceased; but, in the first instance, the most complete and perfect drainage is of so much consequence that almost everything should be made subordinate to it. Lay the stump on some soft absorbing material, of which the writer thinks teazed oakum is about the best, and so place it that the discharge will get freely away.

No splint should, as a rule, be applied, and if possible, the end of the stump should be slightly depressed during the period of suppuration. A piece of lint wetted in a weak solution of some antiseptic may be laid loosely over the end, but this is not requisite, as where the air in which the patient lies is tolerably pure, stumps do as well uncovered. For three days the first dressing should be left, and afterwards only such changes made as will insure the most perfect cleanliness, *which is essential.* Great gentleness in dressing. No scrubbing, but the free use of a current of water from a kettle or a syringe; the adjustment of the loose sutures as required, and their support, if need be, by strips of adhesive plaster as the wound consolidates and the stump requires moulding, and then, too, careful bandaging to secure a good shape, comprises all the necessary directions the writer's experience has shown him to be required in the great run of amputations.—*Glasgow Medical Journal, October* 1874, *p.* 446.

29.—ON THE TREATMENT OF FRACTURES.

By W. H. B. Winchester, Esq., Barnes.

If muscular contraction, instead of being an injurious, is a beneficial force, it becomes of paramount importance that it should be utilised but not destroyed, and thus by its innate strength of impact only rendered as active and efficient a means for preservation of position as it has hitherto been for displacement, besides affording at the same time the exact amount of natural stimulus, accurately adjusted to the requirement of each individual case, necessary to excite speedy and perfect reparation.

To illustrate the injurious effect of permanent extension, I need only draw attention to cases of fracture of the patella, where the natural result of muscular contraction is the same as that artificially produced in other cases—viz., the separation of the fractured ends; and it is impossible in permanent extension for it to be otherwise. Here, unfortunately, it is opposed to the approximation of the surfaces of the broken bone, and hence the surgeon's diffiiculty. There he interposes and opposes the approximation, and hence again his difficulty with the same result,—viz., retarded union. Now let us see how the surgeon tries to imitate the natural effect of muscular contraction. Having succeeded, though unintentionally, by means of permanent extension in producing a case of retarded union or ununited fracture, he is anxious to re-excite the dormant natural effort, and this he does by rubbing the fractured ends forcibly together, and at the same time adopting such means

as he thinks most likely to preserve position, even to the drilling of holes in the shaft of the bone, near the seat of fracture, and driving iron, ivory, or wooden pegs into these holes, and then ties them as closely together as he can in order that the stimulus of the previous friction should not be lost. Whereas, had he only utilised that which he has destroyed—viz., the natural stimulus and retentive tendency of muscular contraction—he would have saved himself all the anxiety, and his patient the endurance of prolonged suffering.

In the Lancet for the 17th Oct. is a report of a case of ununited fracture treated in the Middlesex Hospital, which admirably illustrates the injurious tendency of extension, and at the same time of improperly constructed forms of apparatus. No less than three different forms of splints, acting on the same principle, were applied in this case with the same unsatisfactory result. It need only be contrasted with cases of a similar nature, treated in the same hospital, under the care of Mr. De Morgan in 1855, upon the principle for which I contend, to establish the correctness of that principle in contradistinction to the method of treatment as therein and generally adopted.

Permanent extension, as applied to fractures, and *extension* also after replacement, should be discarded from the vocabulary of the surgeon, and *retention* substituted for it; and this is of easy accomplishment by properly constructed forms of apparatus.

Having on former occasions, in the Lancet and other periodicals, described various forms of my apparatus for carrying out the principle above indicated, the chief of which are now in the Museum of the Royal College of Surgeons, I will, on this occasion, describe a ready but effective means by which the principle can be tested, by any surgeon desirous of doing so, at the cost only of a little trouble at first, but which, unlike the ordinary extension apparatus, when once properly adjusted involves no further trouble.

For fractures of the thigh a Liston's long splint, or a piece of deal of length sufficient to reach from about three inches above the spine of the ilium to a little beyond the sole of the foot, and of about three inches wide, will do. Make longitudinal slits into the holes in the upper end of Liston's splint and do the same in the other. Make a pad of the same width, and a little exceeding in length the splint; three or four folds of linen will do. Sew these together, and at the same time, on one side, the whole of its length, pieces of ordinary bandage sufficiently long to reach round the body and limb, and on the other a piece of linen about three times the width of the splint. This is for the purpose of securing the stuffing afterwards

described. Let the patient lie on his back, as if erect, the body not inclining to one side more than the other. Place the pad against the limb, and fasten it by means of the bandage, so that it lies closely throughout its whole length. Against the pad lay the splint, and where it touches the limb secure it by means of extra pieces of bandage. Now adjust the perineal band. This must be done with care, as the length when once fixed must not be altered. Fill in now completely, evenly, yet firmly, the interspaces between the body, limb, and splint, with any material at hand which will not readily shift its position, such as rag, paper, tow, hay, straw, &c. Having done this, secure the ends and sides to the splint by means of drawing-pins or tacks. Remove the splint from the side, and secure the pad immovably to it by tying it through and through. Adjust the fracture, and apply the splint in the ordinary way by bandage, which for security should be tacked to the sides of the splint. By this means the natural form and length of the limb will be preserved; muscular contraction restored in all its energy, not destroyed; and nature thus assisted, not impeded, by art, is enabled to perform her work in the most speedy and perfect manner possible. More than this art cannot achieve.

In fractures of the leg, whether simple, compound, or comminuted, a rough-and-ready yet effective apparatus can be contrived as follows:—Take a piece of board half an inch thick and somewhat wider than the limb; scribe the outline of the sound limb upon it, and, by any ready means at hand, pierce holes at equal distances apart along each side parallel to the line, allowing a little space for a pad (if nothing better is at hand, a bit of red-hot iron will do to make the holes); reverse the board and drive pegs of sufficient height into them, and on the underside fasten at each end a semi-circular piece of wood, thus making it a rocking cradle, in order that the limb may be enabled on lateral movement, to carry the cradle or splint with it. Here again the natural form is restored. In cases of compound fracture, the pegs on either side can be removed and any portion of the limb exposed for dressing.

Having now indicated a means by which, at the cost of a little trouble only, the principle I have advocated for the last three-and-twenty years can be tested, I leave it in the hands of the profession to decide whether it is worthy of consideration or not. I trust that those who do give it a trial will not fail, in the interest both of the profession and of the art and science of surgery, to report their experience.

I must not, however, be misunderstood. Undoubtedly there are many cases treated successfully by the ordinary method,

but it is in those cases in which the apparatus approximates most nearly to the natural form of the limb that the best results occur. A straight splint is the proper appliance for a straight limb, and a curved splint for a curved limb; that, in fact, the appliance should assume the natural form of the limb, whatever that form may be, whether by previous adjustment to the sound limb, or by careful adjustment to the injured one at the time of application.—*Lancet, Nov.* 28, 1874, *p.* 757.

30.—UNUNITED FRACTURE OF THE FOREARM, WITH DEFICIENCY OF THE ULNA, TREATED SUCCESSFULLY BY EXCISION AND THE WIRE SUTURE.

By Thomas Annandale, Esq., F.R.S.E., Surgeon to the Royal Infirmary, Edinburgh.

R. K., aged 29, was admitted into my wards on June 24th, 1873, suffering from an ununited fracture of the bones of the forearm. About six months before his admission, his forearm had been severely injured by machinery. Both bones were fractured, and a large lacerated wound was caused by the accident. He was taken to a provincial hospital, and carefully treated for several months. About three months after the accident, a large piece of bone (a portion of the ulna) gradually loosened, and was removed. Three weeks after this, the wound was healed, but the bones had not united properly.

When the arm was examined, a large cicatrix was noticed over the middle third of the bones of the forearm; it was adherent to the ulna for a short distance, but was otherwise free. Both bones were movable at the junction of their middle and lower thirds, but the radius less so than the ulna. The ulna was not only quite ununited, but was deficient for about one inch at the seat of fracture, the result, no doubt, of the necrosis which had followed the injury. The fractured ends of the ulna were displaced towards, and adherent to, the radius. Pronation and supination could not be performed, and the arm was also weak, and, in consequence, useless.

On June 27th, I performed the following operation, with the hope of making the arm more useful. An incision, about three inches long, was made over the dorsal aspect of the ulna, so as to expose the fractured portion of this bone. It was then found that the fractured ends were rounded off and atrophied, and united to one another and to the radius by some strong fibrous texture. These ends were also displaced inwards, and there was fully an interval of an inch between them owing to the deficiency of the bone.

About a quarter of an inch was now sawn off the ends of the ulna; and, as it was quite evident that these ends could not be

brought together, a second incision was made over the dorsal aspect of the radius, and a portion of this bone, including the partially united part, was also sawn off. By thus shortening the radius to a sufficient extent, the ends of the ulna were allowed to meet, the adhesions connecting them to the former bone having been divided. The ends of both bones were then drilled and secured with strong silver wire. The edges of the wounds being brought together with a few carbolised silk sutures, antiseptic muslin was applied in the usual way, and the arm adjusted on a splint. On the 3rd of July, it is noted that the patient has progressed favourably since the operation, and the wound is healing well. On the 8th of July, the wire through the ends of the ulna being a little loose, was twisted more firmly. The patient's progress continues good.

On the 3rd of August, the wounds were quite superficial, and the wire through the ends of the radius being quite loose, was removed. On the 13th of August, the wire was removed from the ulna; and on the 29th, the patient left the hospital, the wounds being almost healed.

Six weeks after this, he returned to show himself, when it was found that the bones were firmly united. The forearm, to a limited extent, could be pronated and supinated; but these and the other movements of the arm were steadily improving, and the limb could already be used in many ways, its strength being greatly improved since the operation.

Remarks.—For the successful treatment of this case, it was necessary to overcome two principal obstacles. These were: (1) the deficiency of the ulna; (2) the displacement inwards of the ends of the ulna, and their adhesion to the radius. In addition, the large cicatrix forming the chief covering of soft parts over the injured bones made operative interference more difficult than if these coverings had been sound. The first of these obstacles was successfully overcome by removing a portion of the radius, so as to allow the ends of both bones to be brought together. The removal of this portion of bone by diminishing the amount of the osseous element of the forearm also permitted the contraction of the wounds in the soft parts to take place satisfactorily. The second obstacle was successfully combated by dividing the adhesions, drilling the ends of both bones, and securing them with strong wire.

This method of securing the fractured ends would, I believe, prove very valuable in many cases of recent compound fracture of the bones of the forearm. It is a most efficient means of preventing their inward displacement, and therefore assists much in preventing also the union of the radius and ulna to one another, a condition not easy to overcome in this class of injury. The wire which I employ in this and other operations

of the kind is silver, of the thickness of that usually employed to secure the corks of soda-water bottles. The instrument used for drilling the bone is a joiner's common small pricker. Having tried more complicated instruments for this purpose, I have now a decided preference for the more simple tool, which I always find to be most efficient.—*British Medical Journal, Jan.* 9, 1875, *p.* 38.

31.—PRACTICAL REMARKS ON FRACTURED FEMUR.

By Dr. THOMAS BROWNE, Surgeon, H.M.S. "Himalaya."

[Muscular contraction is a most important aid in the treatment of some fractures—so much so, that the extension artificially produced by the surgeon in cases of fracture of the femur is sometimes a cause of non-union.]

It seems to me that counter-extension is best obtained by elevating the bed at the foot a height of four or six inches. This tilting is borne without much inconvenience by the patient, and is sufficient for all purposes. Extension is to be made by means of a weight running over a pulley at the foot of the bed, and attached to the leg by means of adhesive plaster. The great secret of applying the extending plaster effectually, so as to avoid slipping, is to cut the plaster of sufficient length to extend almost to the knee, and broad enough to encircle the leg at its upper part about the calf, then gradually narrowing to a breadth of about two inches opposite the ankle. A strip of plaster four feet eight in length and four inches in breadth at the end is usually enough for an adult, but the limb should be measured if a good fit is wanted. The plaster must be smoothly applied along the outer and inner sides of the leg, slitting it at the top if necessary to make it lie neatly. It will be found that a loop of two or three inches long extends beyond the sole of the foot. In this loop must be placed a piece of wood of sufficient length to prevent the malleoli being pressed on. A convenient size for the foot-piece for an adult is about three inches and three-quarters long, by two inches broad; in its centre is a hole to receive the cord to which the weight is applied.

A bandage is then applied from the toes to the knee, passing the bandage beneath the plaster till the ankle is reached, from whence it is carried over the plaster. The weight must not be attached for at least six hours afterwards, in order to allow the plaster to settle and penetrate into the skin. Extension strips applied in this way will remain without any material amount of slipping for a period of six weeks.

The thigh should be fitted with four carefully-padded splints, one on each aspect of the limb, extending the whole length of the thigh as far down as the condyles, except the posterior splint, which should extend two inches below the knee, to aid in steadying the joint. There ought to be an interval of half an inch between the sides of these splints. The extending weight having been applied, these splints are to be secured to the limb by two straps with buckles fastening, for convenience, on the front of the thigh. The extending weight will vary with the requirements of the case; a rough rule is one pound for each year of age up to twenty.

It only now remains to apply the long inner and outer splints. In connection with the application of the long outer splint there is a difficulty not often referred to, and yet very troublesome—viz., the tendency of the splint to become displaced towards the anterior aspect of the limb. This is easily obviated by attaching a piece of wood across the lower end of the splint at right angles to it. The cross-piece need not be more than nine or ten inches long, and for convenience may be of the same breadth at its centre as the long splints (four inches and a half), gradually sloping off towards each end. This effectually prevents any tilting of the splint. This long splint, extending from the axilla to four or five inches beyond the heel, with its cross-piece attached, is to be placed on the outer side of the limb, whilst another splint, also four inches and a half broad, and extending from near the perineum to the ankle, is to be placed on the inner side of the limb. These splints, of course carefully padded, are in their turn secured by a few straps to the leg and thigh; three will usually be sufficient. A broad strap is finally passed round the body, and secures the long splint to the side. A pillow or air-cushion can be placed under the limb, so as to relieve the heel from pressure. These long splints are not employed for the sake of making extension or even for coaptation, but solely to prevent eversion or inversion of the limb. For the purpose of securing the splints in position, straps have the great advantage over bandages that the former are easily loosened or tightened, or even admit of the splints being removed and any little adjustment made, without in the least disturbing the limb.

The illustration will give a clearer idea of this mode of dressing than any mere description. It will be seen that there is no band or other pressure on the perineum, but the extension is made by a weight running over a pulley at the foot of the bed; whilst for counter-extension there is the whole weight of the patient's body, with its inclination towards the head of the bed, given by the bed being raised four or six inches at its lower end.

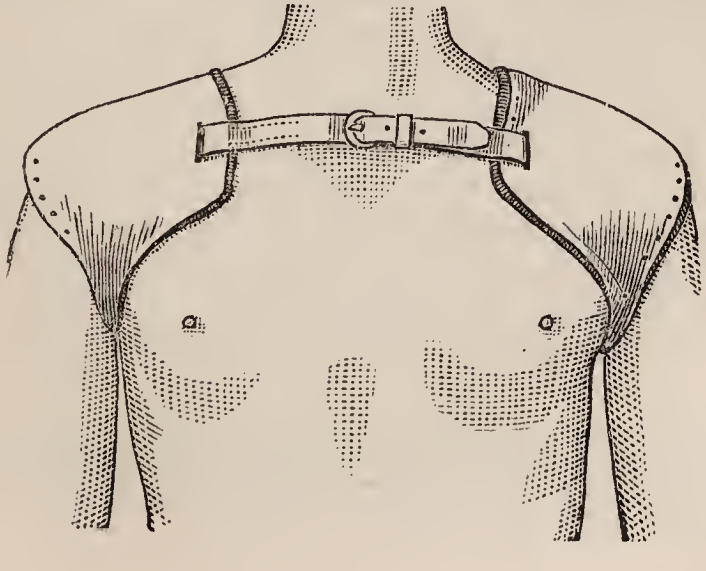
I have seen this mode successfully used in several instances, and think it is attended with less risk and annoyance than any of the numerous plans in common use. I refrain from quoting statistics, as my cases are not very numerous, and the very best results have been so often claimed for the most opposing modes of treatment that even figures must be looked at with suspicion. the amount of shortening in a case of fractured thigh usually depends more on the locality, nature, and extent of the original displacement, than on the particular mode of treatment adopted. If the ruptured soft tissues have once insinuated themselves between the opposing ends of a fractured femur, I fear the most carefully contrived apparatus will not prevent an amount of shortening, for which the surgeon is most unjustly blamed. —*Lancet, Feb.* 13, 1875, *p.* 229.

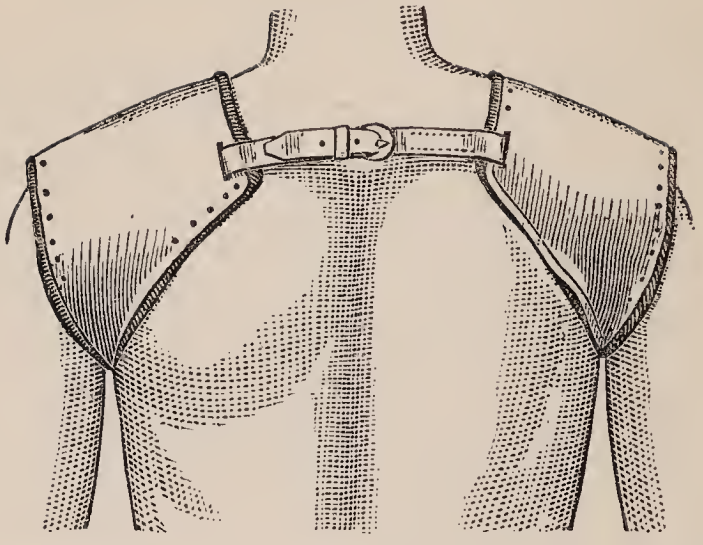
32.—ON THE TREATMENT OF SIMPLE FRACTURE OF THE SHAFT OF THE CLAVICLE.

By Dr. Francis Vacher, Birkenhead.

Having, after repeated trials of Desault's and other apparatus, been disappointed with the results, and found that when my patient was an adult and the fracture between the attachments of the *sterno-cleido-mastoid* and *deltoid*, it was impossible to prevent the inner fragment from over-riding the outer except by bracing back the shoulders, and yet that any purely annular pair of shoulder-clasps, from which to effect the needful retraction, were for the reason given unsuitable, it occurred to me that metal caps which would take a firm hold of each shoulder might accomplish the object sought.

Accordingly, I had made for me, in March, 1872, the simple apparatus here figured. It consists of two sheet-tin shoulder-pieces or caps, soldered at the most dependent parts, where





they are strengthened by stout brass wire over which the tin edges are turned. They are carefully shaped to fit the parts they grasp, having been constructed from a gutta-percha pattern I took great pains in preparing, are lined with wash-leather quilted over thick felt, and are connected together by straps and buckles as seen in the cuts, the anterior strap and buckle being merely to keep the caps from tilting.

Each cap measures five inches across the top, and a trifle broader where the straps are attached; the free margin directed inwards is twelve inches, that directed downwards and inwards fourteen inches, and the circumference taken at the outer border sixteen and a half inches. The weight of the pair inclusive of straps, padding, &c., is just twenty-four ounces.*

They are exactly accommodated to the size of the patient's shoulders by adding to their lining one or two layers of lint, and the cavities of the axillæ are filled in with pads to any required thickness by winding long strips of lint round the soldered portions of the caps. The pad on the injured side, being always made fuller than on the sound side, though it cannot press unduly on the contents of the axilla, is a very efficient fulcrum over which the head of the humerus is drawn, carrying the scapular and external fragment of the broken bone outwards. Bracing the shoulders back by means of the posterior strap and buckle, and supporting the forearm on the injured side by a handkerchief suspended from the neck, completes the reduction of the fracture, and fixes the acromial fragment of the clavicle in the position attained. When the scapula is not sufficiently bound down by the posterior plate a

* In my zeal to have the shoulder-joints firmly laid hold of, I am conscious I have made my caps needlessly clumsy; thus they project outwards nearly an inch and a half more than is necessary, and are undesirably full in the front, so that an equally efficient and much lighter apparatus might easily be contrived.

small pad may be introduced beneath this part of the cap. As regards the anterior strap and buckle, it is perhaps best to fasten it loosely as soon as the caps are imposed, and readjust it after the retraction of the shoulders.

I am prepared to hear that my apparatus is but another addition to the many trifling modifications of approved methods of treatment such as have from time to time sought to attract the attention of the profession since the days when Ledran, David, and Moscati were the recognised authorities on the putting up of clavicular fracture. It is not contended the appliance is more than this. All I claim for it is that if it be skilfully employed it will place and retain the acromial half of a broken collar-bone in a position very closely approaching its position before fracture, without galling the patient's skin, compressing the axillary contents, or interfering with the free action of the chest; and those who have hitherto felt the want of something to do this I am confident will welcome my suggestion.

I have used the instrument in several cases, the subject in each instance being a strong muscular man, and although such force was used in putting up one patient that after two or three days one of the caps broke at the soldering, the pressure had not been complained of as very painful, nor was there physical evidence of it. But, of course, traction, which would be quite intolerable when exercised on a line, may be almost unfelt when made on a broad surface.

If a surgeon were to attempt to reduce a simple fracture of the clavicle by drawing the shoulders back with his index fingers only, he would distress the patient and yet fail to accomplish his object; reducing the displacement, however, is not hard if he firmly grasp a shoulder in each hand. Thus it is all text-books tell us reduction of this fracture is easy, but keeping it reduced is difficult. In other words, what it takes two hands to draw into position can scarcely be maintained there with two narrow fillets.

As I have found the weight of the slung arm generally sufficient to keep it fairly well at the side, the patient can wear his shirt and a loose coat while under treatment; and as often as required he may be laid on his back, and the axillary pads withdrawn and renewed. The apparatus is, therefore, exceptionally cleanly and comfortable, and, I assume it will be conceded, neither complicated nor likely to be very costly.

In conclusion, I may remark that though the shoulder-caps do not altogether prevent the mobility of the sternal fragment of the clavicle, they, in common with all modifications of the figure-of-8 bandage, restrain it somewhat, and if the patient be directed to keep his face turned a little towards the injured

side for the first few days, no deformity need be feared from this cause.—*Liverpool and Manchester Medical and Surgical Reports*, 1875, *p.* 37.

33.—ON EXCISION OF THE OS CALCIS.

By Edward Lund, Esq., Surgeon to the Manchester Royal Infirmary.

[The entire excision of the os calcis is an operation of but rare occurrence, but it happened to Mr. Lund to have had lately three cases of disease of this bone in which resection has been necessary.]

It was while assisting Mr. Southam in two of his cases that my attention was invited by him to a much more simple form of incision for the extraction of the os calcis than I think has been previously practised by surgeons; and I should wish to give Mr. Southam the credit of having originated the idea that so large a bone as the os calcis could be removed from the foot by a single incision, extending only over its external surface, or that which lies in relation with the outer ankle. But for the more particular details of this operation, and the exact directions which I am anxious to give to those who may wish to adopt this method of performing it, I would hold myself responsible.

The incision which I make is commenced at the back of the foot, just on the internal side of the tendo Achillis, on a line with the middle of that part of the os calcis between which and the tendon the bursa is placed, so that the first portion of the incision being carried boldly down to the bone, this bursa is opened and the tendon set free. The incision is then carried round to the external side of the heel, and so directed that it shall pass along a line extending one third down from the tip of the external malleolus to the under-surface of the foot, with a slight inferior convexity, then carried on to the spot where we know the os calcis and the cuboid are in contact; and this, speaking roughly, will be at a point midway between the tip of the malleolus and the end of the prolonged extremity of the fifth metatarsal bone. In doing this it is well to remember the position of that little projecting tubercle of bone which, lying on the external surface of the os calcis, gives steadiness to the tendons of the peronei muscles, so that the incision may come just below this point, and thus, if possible, avoid wounding those tendons. The incision being carried down as here indicated, very little more division of structure by a sharp instrument is needful, for it will often occur that the periosteum of the os calcis is so loosely attached to the bone, by reason of previous

inflammatory effusion, that it can be very easily detached. Should this, however, not be the case, here and there the tissues must be divided by the scalpel; otherwise I have found at this stage of the operation no instrument more useful than one of those bone scrapers or periosteum-knives which are used for detaching the hard palate from the bone in operations for fissure in the mouth, and which are sold in the case of instruments employed for that purpose by Mr. Annandale, of Edinburgh. Of course any convenient form of periosteum knife will serve the purpose. In this way I detach the soft structures first from the underpart and back of the os calcis and, if possible, I even carry the separation as far as its internal surface, so that after a little perseverance and time—and here I may remark that the operation for the removal of the entire os calcis must necessarily be a very tedious one—I am enabled to get the tuberosity of the os calcis to project through the wound by slipping the lower flap well under the bone. The next step in the operation consists in the detachment of the os calcis from the under part of the astragalus, and here it is necessary to proceed upon the upper part of the wound, where, it will be noticed from its position, we have only to work over one third of the distance, and in doing this I take great care to detach the tendons of the peroneal muscles from the side of the bone without injury, which can be done if a sharp scalpel be not used. Having by a slight movement of the os calcis got a little guide to the joints between it and the astragalus, I find that by employing the "astragalus hook" which I have described in the British Medical Journal, 19th October, 1872, much trouble is saved, for it is strong enough to act as a lever for separating the bones, and then, by bearing in mind the oblique direction of the calcaneo-astragaloid ligament, we can without difficulty cut through these fibres, and pull down the os calcis an appreciable distance from the astragalus. Having done this it only remains to separate the os calcis in front from its junction with the cuboid, and here, at first, there may be difficulty in discovering the position of the joint. In order that I may be able to move the os calcis freely, I take firm hold of it, not with the lion forceps of Sir W. Fergusson, which are often so useful in such operations, but with forceps such as are occasionally employed in amputations for the removal of any additional piece of bone from the stump. These are generally made of such a size that the blades fit very well upon the line of the tuberosity, and with the increased leverage thus obtained there is little difficulty in twisting the bone, and moving it about in such a way as to impart to the finger placed over the front part of the wound a sensation of movement between the os calcis and the cuboid. Here a few touches of

the scalpel will divide the dorsal calcaneo-cuboid ligament, and as soon as sufficient space is obtained, the astragalus hook may be here introduced, and partly by leverage, and partly by its cutting action, it will set free the lower calcaneo-cuboid fibres and liberate that portion of the bone. A few portions of fibrous tissue will generally remain lying to the front and the internal side of the os calcis. These have often given me much trouble for their complete division, yet I have found that the astralagus hook has here again served me well. To use it is safe, for it cuts through the tissues partly by laceration, which helps in some degree to restrain the hemorrhage, and it can also be used as a lever with considerable force, and yet each incision made by it is short and limited. It will be seen in this way that the os calcis can be entirely extracted; and provided that in all the incisions which are made during the operation, the instrument (whatever it may be which we employ) is kept close to the bone, no structures of any great importance can be divided, and in none of the three operations which I have performed has the patient complained of any symptoms of nervous pain which might lead me to think that any large branch of the plantar nerves had been injured. With regard to the vessels, the hemorrhage has on no occasion been excessive; in my last operation a branch from the back of the external plantar artery bled very freely, but the flow was easily stopped by torsion. No doubt it was one of those running backwards as a calcanean branch. As soon as the os calcis has been thus got out it becomes our duty to ascertain, either by the finger, or by ocular examination, what may be the condition of the under surface of the astragalus and of the posterior surface of the cuboid. Here, if the cartilages are roughened or destroyed, or if the bone should appear to be softened (as occurred in one of the three cases I have mentioned) it will be right to gouge away, or by some other method remove, all the softened bone we can get hold of. And supposing the diagnosis to be correct as far as the movements of the ankle are concerned, and the condition of the internal border of the foot, it may be assumed that no other bones will require to be interfered with.

As regards the after-treatment of these cases, I must here repeat what I have so often had occasion to state in previous papers in these Reports, that each case has been conducted as strictly as possible on the antiseptic system. But in reference to this plan there are a few points upon which I deem it well to offer some observations. In the first place, I have observed in this operation especially, and in most operations upon the foot, that the antiseptic system seems to be here less successful as far as entire avoidance of putrefaction is concerned than almost any other part of the body. Why this should be so is rather

difficult to say; but I believe it is partly due to the fact that serum and sero-pus when secreted at this distant portion of the body, far away from the centres of the circulation and the nervous system, have in some way less resisting vital power, and are disposed to undergo more rapid decomposition: or else it may be that, in each of these three cases, there had been for a lengthened period before the operation, old diseased bone and old sinuses in the soft tissues in which fœtor had remained for several days notwithstanding my adoption of Prof. Lister's plan of injecting these sinuses freely with a strong solution (forty grains to the ounce) of chloride of zinc immediately before beginning to operate, so as if possible to destroy absolutely all present putrefaction, and start, as it were, afresh upon healthy tissue. The only means by which I think it might be prevented in any future case would be, first of all, to take care as soon as the bone is removed, to bring the edges of the incision somewhat in contact, drawing up the depressed flap from the sole of the foot, and making the cavity from which the bone has been removed as complete as possible; then to fill the cavity with a strong watery solution of carbolic acid, allowing it to remain there for a few minutes, and then repeating this process for two or three times in succession. This is an excellent method of cleansing recent wounds of a deep figure, since by reason of the wound being filled with the lotion, there is the best possible chance of the surrounding tissue becoming thoroughly saturated with it. The other method, which I have already tried in similarly deep wounds with much benefit, though not with complete success, and which is certainly meritorious, is to stuff the wound with strips of cere-cloth or antiseptic gauze dipped in a solution of glycerine and carbolic acid (one part in ten), so as to supply useful pressure that shall arrest the oozing from the smaller vessels, and also act as a good receptacle and absorbing medium in which the blood can soak, and be protected from putrefactive change. In fact, it is now my constant practice in all operations conducted upon the antiseptic principle, to cover the wound immediately after the operation, with six or eight folds of cere-cloth steeped in this carbolic glycerine. I find that the blood which oozes from such wounds falls into the cere-cloth so prepared, and mingling quickly with the glycerine forms an impervious covering to the wound, from which, when first dressed, it can be easily removed. As to the necessity for using the india-rubber drain tube in these cases, if I have employed strips of cere-cloth and glycerine to project beyond the centre of the wound, and to be removed on the second day after the operation, I find they leave sufficient outlet for all future secretions, providing the patient can be persuaded to keep the foot and leg resting on

the bed entirely on the external side, in which case the drain will be perfect, and there will be no serious accumulation within the cavity. I generally use about four or five sutures at the time of the operation, introducing them from each angle of the wound nearly up to the centre, and leaving a portion in the middle unclosed, through which, as I have said, the strips of cere-cloth are to be drawn. As the cure advances to completion the surgeon will often notice that the lower edge of the incision has a great tendency to become inverted and drawn in beneath the upper edge. This, in my second case—that of the woman who made so good a recovery, gave me some anxiety, for I thought it would spoil the ultimate result by making the heel smaller and flatter. But I found that gradually this inversion of the edge subsided, and at last without any special interference it became placed opposite the other portion. In none of the three cases have I yet had any complications in the way of abscesses at a distance from the wound, or inflammation along the line of the tendons, and I attribute this entirely to the careful employment of antiseptic measures.—*Liverpool and Manchester Medical and Surgical Reports*, 1875, *p.* 174.

34.—ON "THE LEAST SACRIFICE OF PARTS" AS A LEADING PRINCIPLE OF SURGICAL PRACTICE.

By Thomas Bryant, Esq., F.R.S., Surgeon to Guy's Hospital.

[In the following paper the value of the principle is illustrated by the surgery of the joints.]

I feel more convinced year by year that disorganised joints are more amenable to direct local surgical treatment than is generally supposed, and that free incisions into joints and the removal of necrosed bone from joints are both excellent and successful operations. Both these measures are far less severe than resection in the bulk of cases, and far less serious than amputation; and in a number of instances they are also most successful. To say that these minor measures in all cases are likely to supersede the more severe would clearly be wrong; although I feel convinced that I am not saying more than what is true when I express my belief that a large number of joints would be saved and useful limbs retained were the practice I am now about to illustrate more freely followed. I will now quote a few cases of suppuration into joints treated by incision to illustrate my point.

Case 11. *Pulpy disease of ankle-joint; recovery with good movement after free incision into joint.*—Tom W., aged four, came under my care at Guy's Hospital on Jan. 30th, 1865, with a disease of the ankle-joint. It was on the right side, and had

existed for seven months, having come on after an injury, with pain and swelling. When seen, the joint was clearly much enlarged, the parts around the malleoli, &c., being doughy and thickened. There was pain in the part and daily flushing with heat, especially at night. Fomentations were ordered, with tonics, and by Feb. 20th all heat had disappeared, and all pain and indications of inflammation. The joint was consequently strapped up. The child was then, contrary to orders, allowed to use his limb, and as a consequence a relapse took place. The symptoms became as bad as—indeed, worse than—ever, and suppuration followed, an abscess opening on the outer side of the joint on May 15th. On May 19 another formed about the inner malleolus, and it was clear that the joint was thoroughly opened. A free incision was made into the joint about the inner malleolus, and its contents allowed to escape without hindrance. Water dressing was applied. From this time everything went on favourably. By June 10th the abscess and the incision over the external part of the joint had healed, and all pain had ceased. By September things looked as if they were about to consolidate. On Oct. 5th there was another relapse, and another abscess formed, and severe joint symptoms with constitutional disturbance made their appearance; indeed, it appeared as if an abscess had burst into the joint from the breaking down of some of the pulpy disease in the synovial membrane. The symptoms, however, gradually disappeared, and by Nov. 27th all their severity had gone. From this date everything went on favourably, suppuration ceased, and all thickening of the synovial membrane gradually disappeared. By Feb. 19th, 1866, all the abscesses had healed and the sinuses were closed, and by April the joint reassumed its natural aspect, all thickening of the soft parts having subsided. Strapping was again employed to hasten the absorption of the inflammatory products, and by April 9th the case was reported as well, with, what was hardly to be expected, a movable joint. By December, 1866, the joint was quite sound, perfect movement existing, the remains of the cicatrices and some weakness of the joint alone remaining to testify to the severity and nature of the disease. On December 7th, 1868, this boy called on me, and the joint was still sound and useful, no traces of disease beyond cicatrices remaining. The astragalus moved as smoothly as possible between the malleoli. He is still well.

Case 12. *Pulpy disease of ankle-joint, treated by free incisions; suppuration and recovery.*—William R., aged nine, was brought to me at Guy's Hospital on July 4th, 1864, with a disease of his right ankle of two years' duration. It had appeared after a blow, with pain and swelling, and at uncertain intervals these symptoms had continued ever since. When he

came under observation the synovial membrane projected round the malleoli and was much thickened, and appeared in parts to be breaking down; any movement of the foot caused pain, and the astragalus did not move smoothly in its socket. A splint was applied and tonics given. For a time the symptoms improved with the child's health, and it was hoped that suppuration would not take place. In March of the following year, however, two abscesses formed, one on each side of the joint, and it was clear by the passage of a probe that the joint was opened. A free incision was then made on each side, laying the joint open freely, and a splint was kept on. In six months the wound had healed, and the parts appeared to have become consolidated. In another three some movement in the joint appeared. In July, 1866, when last seen, the boy could walk well without pain. The movements of the joint were complete. The boy, however, required some extra support for his ankle, but had a good foot.

Case 13. *Pulpy disease of the left ankle-joint; suppuration; recovery with a movable joint.*—Cornelius M., aged three years, was brought to me at Guy's Hospital on Dec. 14th, 1865, for disease of his left ankle. It had come on after a fall, received some months previously, with pain and swelling, the joint being at times hot and painful. When first seen by me the articulation was clearly swollen from inflammatory infiltration of the synovial membrane. The whole part had a soft and pulpy feel, and the margins of bone were all covered in. There was no bulging of the synovial membrane from effusion, and the articulation moved smoothly. Fomentations with strips of wet rag were ordered to be kept on the joint, and the horizontal position was maintained; tonics were also given. By the 30th of January the symptoms had improved; but on February 26th they had again become severe, suppuration threatening. On March 12th an abscess was opened by a free incision in front of the inner malleolus, which was clearly connected with the joint; consequently a splint was applied. By the 25th of June all swelling had nearly subsided, and all heat had gone. Pressure with strapping was applied; and on Sept. 3rd (six months after the incision) the child was declared to be cured, with a good and movable joint.

Case 14. *Pulpy disease of the synovial membrane of the ankle-joint; free incisions, recovery with a good joint.*—Alfred T., aged five years and a half, came under my care at Guy's on Jan. 1st, 1866, for disease of the right ankle-joint of three years' standing. It had appeared after a fall, and had commenced with pain and swelling. When seen, the whole ankle was much swollen, soft, and pulpy to the touch. It was hot and painful, although some movement was allowed. Fomentations were ordered, and steel

wine given with good food. The boy was directed to be kept in a bed. On Jan. 29th an abscess appeared on the inner side, which was opened by a free incision, the pus clearly coming from the joint, for it could be pressed out. Water dressing was applied. The case went on satisfactorily after this for a time, but by June 14th a second abscess appeared on the outside from the breaking up of the inflammatory effusion. This was treated also by a free incision, and water dressing applied. At this time the inner wound had quite healed. In three months the outer incision had also cicatrised, and the swelling about the joint had disappeared. Some movement of the articulation also existed. In August, 1868, nearly two years after this date, the child was brought to me, when the movements of the ankle-joint were smooth and perfect, the only marks of the old disease being the cicatrices and the weakness of the joint.

Case 15. *Synovitis and disorganisation of the ankle-joint, treated by free incision; recovery with movement.*—Eliza M., aged two years, was brought to me at Guy's on Feb. 25th, 1864, for disease of the right ankle. It had existed for six months, and had commenced with pain and swelling. When seen the joint was clearly much diseased. although the cartilages were apparently perfect. There was great thickening of the synovial membrane all round the malleoli and the joint, and the parts were hot. Fomentations were ordered with tonics. On March 1st all the symptoms were worse, and suppuration of the joint was threatening. On March 31st the articulation was laid open on its inner side. The whole joint having apparently broken down, a splint was applied. Much relief followed the laying open of the joint, and from that time things began to mend. On May 10th there was a little discharge, and by July the wounds had healed. The splint had been kept on during the period. By July 30th the splint was removed, and on Sept. 10th some movement in the joint was visible. In December the movements were much more perfect, and on April 10th, 1865, when the mother again brought the child, I was surprised to find that the foot moved freely and smoothly between the malleoli and without pain. The joint was weak, and required some support, but it was sound.

Case 16. *Disease of the knee-joint, ending in suppuration, treated by free incision; recovery with movable joint.*—William S., aged thirteen, came under my care in February, 1865, for severe disease of the right knee-joint. It had existed for three years, and had appeared with pain of a dull aching character in the part for at least six months before any visible enlargement of the joint had appeared. The swelling gradually increased after that time, and the pain continued. He had been under

care for some months at a metropolitan hospital. When I saw the boy the knee was much enlarged from a thickening of the synovial membrane over expanded epiphyses. There was increased heat in the joint, and pain on pressure. There was little movement in the articulation, but what existed was smooth. An abscess was clearly forming over the inner condyle of the femur. A splint was applied to fix the joint, fomentations ordered to the abscess, and tonics given. On March 1st the abscess was opened freely, several ounces of unhealthy pus and synovial fluid making their escape. The wound healed kindly, and the swelling of the soft parts over the bone gradually subsided, and on December 15th it was noticed that all evidence of disease of the synovial membrane had disappeared. The splint was, however, kept on, as it was thought unlikely that any other result than a stiff joint could possibly result. On Sept. 3rd, 1866, the splint was removed, and, to the satisfaction of all, the joint was found to have recovered, and to be partially movable. By December 17th the mobility of the joint had much increased, and by January 3rd, 1867, he was pronounced perfectly cured. He was seen again on March 24th, 1868, with the parts quite well, the expanded epiphyses having greatly contracted. On May 2nd he hurt the joint by a blow, and some slight indications of mischief reappeared, but these subsided in a few days under rest and fomentations, and in three weeks he was again well. In August, 1868, the joint was still sound.

Case 17. *Disorganisation of elbow-joint, after an injury, treated by free incisions; recovery with movement.*—Walter L,, aged nine, came under my care at Guy's Hospital on May 13th, 1867, for great enlargement of his right elbow-joint, following an injury received three months previously. Swelling, with constitutional symptoms of a severe nature, followed the accident, and since then the enlargement has been gradually increasing. When I saw the boy, the elbow-joint formed one large abscess. His appearance was one indicative of suffering. He refused to come into the hospital. Two free incisions were consequently made into the joint, one on either side, and an anterior angular splint applied. Pus freely escaped, and free crepitation was felt on moving the joint, Tonics were prescribed, with good living, the boy being in tolerably comfortable circumstances. In one week the condition of the part had much improved, the swelling had subsided, and the sinuses still discharged. He then consented to be admitted into Guy's. All the symptoms, however, rapidly improved, the swelling gradually disappeared, and the wounds healed. By October 10th, there was only one sinus open on the inner side, and all pain and swelling had vanished. On examination there was found to be some move-

ment in the joint, and three months subsequently this had much increased.

Case 18. *Disease of shoulder-joint; suppuration; treatment by free incisions; recovery with a movable joint.*—Henry F., aged sixteen months, was brought to me at Guy's Hospital on Oct. 12th, 1863, for acute suppuration of the right shoulder-joint of five weeks' standing. It had appeared without any known cause, with swelling, severe local pain, and constitutional disturbance. Suppuration made its appearance the day before he came under my notice, and a large abscess was freely opened in front of the joint below the insertion of the pectoral muscle. A probe readily passed through the wound into the joint. The joint was much thickened, and any attempt to move it caused pain. The child's face clearly indicated the severity of the symptoms. Fomentations were ordered, with tonic medicine; and by Nov. 2nd, or in three weeks, the abscess had almost ceased to discharge. By Nov. 9th the wound had closed, and the shoulder was clearly becoming much smaller. On Nov. 16th some movement in the joint was detected, and in six months a perfect recovery was noted. The movement was good, although some amount of crepitation existed.

Case 19. *Enormous abscess involving the shoulder-joint; free incision; recovery with movable articulation.*—Eliza W., aged five, was brought to me at Guy's Hospital on Dec. 18th, 1862, for an enormous abscess completely surrounding the left shoulder-joint. It had been coming on for one month after an inquiry, and had been attended with severe constitutional disturbance. A free incision was made into the abscess in front of the joint, and a quantity of pus let out; immediate and permanent relief followed. For three months the sinus discharged pus, and the joint appeared to be diseased, for any movement of the articulation caused pain, and was attended with crepitation as of bare bone. In another three months, however, all these symptoms had disappeared, and the child appeared before me with a good arm and a movable joint.

In this case the suppuration clearly came from beneath the deltoid muscle, and was apparently within the joint. The result of the case, however, throws some doubt upon this point, for I never saw so complete a recovery of a shoulder-joint articulation after suppuration as existed in this instance.

The nine cases I have just quoted were all examples of suppuration of a joint from synovial disease. In all incisions were freely made as soon as good evidence existed of suppuration, and in all a good result followed, the disease not only being arrested in every case, but a movable joint being saved to the patient.

The disease, however, in each occurred in children; and it is in such subjects that we meet with the most perfect illustrations of the cure of disease by natural processes. Nevertheless they serve well to illustrate the practice I am here inculcating.

In the next series of cases the same treatment was applied, although with a different result, anchylosis of the joint following in all.

Case 20. *Disease of the hip-joint; suppuration and anchylosis; treatment by free incision.*—Dennis M., aged four, was brought to me at Guy's Hospital on March 19th, 1866, for limping with his right leg. It had been observed for three weeks, and had come on without any history of a fall or injury. The child had complained also of pain in the part. On examination the pelvis was tilted to the left side, giving the appearance of elongation to the affected limb of about an inch. There was no enlargement or thickening about the joint, no increase of heat, or pain on gentle manipulation. The glands in the groin were healthy. Firm pressure, however, upon the trochanter gave pain, and any attempt to move the limb excited spasm of the muscles. The parents were directed to keep the child off its legs, to bathe the part with warm water, and to give tonics. By the 9th of April the symptoms had improved; there was less pain and less spasm of the muscles. By the 16th they were still better. The child then disappeared from view, the parents thinking he would soon be well. He soon began to use the limb. On Oct. 15th he reappeared, with evident thickening about the joint, particularly about the neck of the bone. It was more painful on pressure. The symptoms had been worse for three weeks. On Dec. 3rd a large abscess showed itself behind the trochanter, which was freely opened, the finger passing through the abscess down to the joint. A splint was applied. On Jan. 6th the abscess was discharging, but the child seemed well in his general health. By the 3rd of May the sinus had closed, and the joint was clearly becoming anchylosed. By the 20th of October it was firmly fixed. On Dec. 10th my report states that the joint was quite stiff and immovable, and free from all pain. The child subsequently went about freely with a stiff joint.

Case 21. *Suppuration of the knee-joint after miscarriage; free incisions into the joint; recovery with a stiff limb.*—Eliza K., aged thirty-five, a married woman, came under my care on October 7th, 1864, with a suppurating knee-joint. It had been coming on for six weeks, and had followed, in three days, upon a miscarriage at the second month. The symptoms of inflammation of the joint had been very acute and the constitutional disturbance severe. When I saw the patient the joint was much swollen, hot, and painful, and any attempt at

movement caused great distress, and severe constitutional disturbance existed. The patient's powers were very feeble. On October 8th a splint was applied, and free incisions made into the joint, one on either side of the patella. Pus and broken-up tissue escaped. Water dressing was applied. From this moment things began to mend; fever and other symptoms disappeared. The woman took food freely and pain gradually subsided. Anchylosis also went on rapidly. On December 9th, on removing the splint, the joint appeared to be fixed. The wounds had healed, and all constitutional symptoms had disappeared. On Jan. 10th, the woman walked out of the hospital, wearing a good leathern splint, with a firmly anchylosed joint. In January, 1868, she was still well, wearing the splint. She could walk about freely, without pain or inconvenience.

Case 22. *Acute suppuration of the knee-joint, following a puncture into the articulation; the subject of the pulpy disease of the synovial membranes; free incisions into the joint; anchylosis.* (Reported by Dr. P. H. Pye-Smith.)—Ellen C., aged six, a fair but healthy-looking child, was admitted into Guy's Hospital, under Mr. Bryant's care, on December 10th, 1861, for some disease of her right knee. It appeared that the disease had commenced about twelve months previously by swelling of the joint, this swelling being accompanied with pain and heat in the part; it steadily progressed for nine months, when she applied (some three months before admission) to a hospital, where an opening was made into the joint on its inner side to let out what was believed to be fluid, but nothing escaped, and as a result acute inflammation of the joint followed, with suppuration. The child's parents not wishing the child to remain longer in that institution, removed her, and brought her to Guy's. When admitted the joint was much enlarged, and was suppurating profusely. The slightest movement caused intense pain. The child looked anxious and worn, and had little power. Mr. Bryant ordered a back splint to be applied, and water-dressing to the knee, quinine and wine being given internally. In a week's time, as the opening into the joint was small and suppuration profuse, Mr. Bryant made a free incision into the joint on the outside of the patella, giving exit to pus and broken-up tissue, and from this time everything went on favourably; the discharge gradually diminished, surgical fever disappeared, and the powers of the patient improved. On April 12th, 1862, or four months after admission, the joint was firmly anchylosed in a straight position, all suppuration had ceased, and the child's health was re-established. A splint was kept on the back of the knee for some months subsequently as a precautionary measure, and a

good leg was secured. The child left the hospital on Aug. 10th with a useful limb, and in good health. She was heard of one year subsequently, and had free use of her limb.

Case 23. *Abscess in shoulder-joint; recovery with anchylosis.*—Walter D., aged four, came under my care at Guy's Hospital on Jan 28th, 1866, for what appeared to be an abscess around the left shoulder-joint. It had been coming on gradually without any assignable cause, with pain and swelling, the former at times having been very severe. When he came under my care a large abscess existed, surrounding the whole shoulder. No movement of the limb could be allowed, and any attempt gave severe pain. It was opened freely in front where it was pointing below the tendon of the pectoral muscle, and many ounces of pus let out. In a few days another opening was naturally made behind the joint. The bone about the upper third of the arm and about the joint was felt to be greatly thickened. On March 21st things had much improved. There was still some discharge from the sinuses about the joint, but much of the thickening had gone down. It was clear also that the head of the bone was becoming rapidly fixed to the scapula. On June 5th all the sinuses had healed, and in August the head of the bone had become completely anchylosed to the glenoid cavity.

Case 24. *Suppuration of elbow-joint after injury; excision contemplated; anchylosis.*—Alfred T., aged nine, came to me at Guy's Hospital on May 19th, 1862, with suppuration of the right elbow-joint. The disease had been set up in the joint some months previously by a blow; an abscess rapidly formed in the part, accompanied with great pain and severe constitutional disturbance. When I saw the lad the joint was much swollen, and several sinuses existed discharging freely. Any attempt at movement caused pain. The sinuses passed directly into the joint. A splint was applied, and tonics, as quinine, given. On June 1st the suppuration was profuse, and on July 10th the same report was recorded. The boy was ordered to come into Guy's to have excision performed, but this was refused; consequently, a free incision was made into the joint. In another month all the symptoms began to improve; the swelling of the joint began to subside, and the discharge to lessen. By October 20th the report states that the boy was convalescing, and in January, 1863, the arm had become stiff and good anchylosis had taken place. The joint was fixed at a right angle.

I might quote other cases to illustrate the value of the practice I am now advocating, particularly of suppuration of the smaller joints; but I think I have done enough to prove that it is of use in a large number of examples of disease of the

joint ending in suppuration, more particularly of the synovial membrane, and that, by the adoption of such a practice, a mobile joint may be hoped for with some confidence, even after suppuration. I trust I have also done something to show the value of a correct diagnosis as to the seat of the disease—a point which is to be made out only by a careful consideration of the clinical history of the case—before a plan of treatment is adopted; and that I have strengthened somewhat the hands of the surgeon in aiding natural processes in the cure of disease. In doing this I feel I am only building upon the suggestions made by Mr. Gay in the Medical Times and Gazette, vol. xxiv., p. 546 (Lond. Med. Soc., November 22nd, 1851); and if I have added to the value of his suggestions anything of my own, it has been from the experience I have acquired as to the great importance of the plan of treatment he there inculcated.

These observations were written in May, 1869, in a paper I published "On the Treatment of Suppurating Joints by Free Incision" in one of the journals, and I may add that subsequent experience has but confirmed me in the impression I had then formed. A free cut into a suppurating or disorganised joint, whether associated or not with bone disease, is rarely followed by any other than a good result. When the suppurating process is due to synovial disease, a recovery without further surgical interference may be looked for. When due to local necrosis the incision helps nature towards the recovery of the cases by expediting the process of exfoliation, and the subsequent removal of the bone by either natural processes or some surgical proceeding. And in still more severe cases the incision gives relief, and in no way tends towards inducing any increase in the mischief.

"The surgeon may, in pathological amputations, fearlessly divide tissues infiltrated with organised inflammatory products, and even cut through the walls of suppurating cavities, or through diseased joints, more particularly to save amputation above a joint."

I have followed this practice for many years, and have never had any reason to regret doing so. The parts divided have united as well as they could have done under other circumstances, and in some instances I have been disposed to think they have united better. In the joint cases in which I cut through the articulation the success was always good. The following cases will illustrate these points.

Case 36. *Acute ostitis of tibia; disorganisation of knee-joint; amputation; flaps infiltrated; endostitis of femur; removal of sequestrum; recovery.*—Jacob B., aged twenty, a labourer, came under my care at Guy's Hospital in August, 1863, for what appeared to be a phlegmonous inflammation of the whole of

his left leg and suppuration of the knee-joint, with necrosis of the tibia. From the history of the case it seemed that the affection had commenced two months previously as an acute inflammation of the tibia, and that suppuration rapidly followed the early symptoms, with disorganisation of the knee-joint. The diseases when seen had extended from the bone to the joint, and it was clear that nothing but the removal of the leg could be entertained. I then thought that the amputation must be performed above the knee, although the thigh was so infiltrated with inflammatory material that the position of the amputation was not so easy to determine. From the history of the case, however, there was no evidence of disease of the femur; consequently I determined to remove the limb as near to the knee-joint as I could, and this I did on Sept. 15th. I amputated by making a long anterior flap from the front of the knee, and a shorter posterior. I had to dissect both flaps upwards with some care, the parts cutting like brawn from being infiltrated with lymph. The femur I divided close above the condyles. I brought the parts together with sutures, and primary union of nearly the whole surface took place. There was no retraction of flaps; indeed, the stump united and repaired better than most stumps. Only enough, however, when the parts had repaired, without any apparent reason, endostitis attacked the shaft of the femur, which ended in necrosis, and nearly the whole bone was subsequently removed, the dead shaft being drawn out of its sheath (periosteal) from the end of the stump, and a good recovery ensued.

This operation was performed in 1863, before I had had much experience in amputation at the knee-joint. Had the case occurred more recently I should have treated it differently, and amputated at the knee-joint, and thus, by avoiding making a section of bone, I should probably have had no such consecutive ostitis and necrosis of the stump as took place.

Case 37. *Disease of knee-joint; destructive synovitis; amputation of thigh; flaps infiltrated; rapid union.*—Charlotte R., aged twelve, pale but fairly nourished, was admitted into Lydia Ward on Sept. 18th, 1872, her right knee being much swollen and twelve inches round, whilst the left was only ten inches and a half. On the outer side there was an open wound about two inches long by one and a half. There was fluctuation in the swelling, but the patient could move the joint. The head of the tibia appeared to be enlarged. The patient's father and mother were alive and well. She had small-pox six years ago. Five years previously she thought she struck her knee; she had great pain in it at the time and it was swollen, but movement was perfect. She attended St. Bartholomew's as an out-patient for about a month. She took some medicine,

and was ordered to poultice the knee, after which it became better, until eight weeks before admission, when she went as an out-patient to St. Thomas's. It was bandaged every week for six weeks, and her friends then called in a surgeon, who applied first a poultice, and then eight leeches, which relieved the pain. He then lanced the knee, and a considerable discharge came from it; he afterwards advised her to obtain admission at Guy's. On Sept. 19th the swelling was opened, but no discharge came; a piece of lint was inserted. Four days afterwards the leg was put on a straight splint. On the 25th a great deal of discharge came away every time the poultices were removed; the piece of lint was removed. Five days subsequently a small red spot, three-quarters of an inch in diameter, appeared on the inner side of the knee, and looked as if it would break down. On Oct. 2nd amputation was performed by antero-posterior flaps of skin and muscle. The muscles were infiltrated, and did not retract when cut. The thickened tissues around the artery were slit up to allow the femoral artery to be twisted. The flaps were brought together with carbolised gut sutures, and the wound dressed with dry lint, covered with cotton wool. Six inches of femur were removed. There was extensive pulpy thickening of the synovial membrane and surrounding ligaments, this tissue in many places hiding the articular surface of cartilages. The crucial ligaments were soft and easily cut. The articular cartilages were quite healthy. On the 3rd of October the pulse was 124, the temperature 98·2°; on the 7th the pulse was 112, the temperature 99·2°. The leg was dressed; the parts looked healthy, and there was hardly any discharge.—Nov. 4th: The wound had been dressed every second day from the last date; the stump looked healthy. Four days later some exuberant granulations were touched with caustic, and a fortnight later with blue stone. This was repeated on December 3rd, and again on the 5th, when the wound was healing well. The patient progressed uninterruptedly, and was discharged on January 12th, 1873, the stump being almost healed, and in other respects quite well.

Case 38. *Extensive disease of knee-joint; Carden's amputation through the condyles; integuments and flaps infiltrated with lymph; recovery.* (Reported by Mr. Congdon.)—Samuel J., aged forty-four, was admitted into Guy's Hospital on the 5th of November, 1869, under the care of Mr. Bryant, with extensive disorganisation of his left knee-joint. It began fifteen months before, after a blow, with pain and swelling. Abscesses formed, and he went to a London hospital, where they were opened; but it was not supposed the abscesses communicated with the joint. He had been unable to put his foot to the

ground for months. The man had lived hard. On admission the leg was flexed on the thigh at a right angle; the knee-joint was much swollen, and the skin shining from distension. It measured eighteen inches round—four more than the right. The enlargement was uniform, extending half way up the thigh; it had a soft semi-fluctuating feel. Any attempt at manipulation caused severe pain. Sinuses existed in the popliteal space and on the outer side of the joint, discharging pus. Nothing but amputation could be entertained. On November 19th Mr. Bryant performed the operation after Carden's method, making one long anterior skin flap and a short posterior. Mr. Bryant made this posterior flap longer than Carden suggests, having found it necessary to do so. He divided the femur through the condyles. The flaps were brawny from inflammatory fibrinous infiltration, and a large abscess was cut through, its walls being left in the flaps. The popliteal vessels were secured by torsion and the parts brought together, the flaps meeting behind and two inches above the end of the bone. The stump was dressed with dry lint and covered with cotton wool; it was fixed on a splint. After the operation the man went on favourably in all respects; his temperature never rose above 99°, and the parts healed well, although a small abscess which formed in the stump retarded convalescence. He left the hospital well, with a good broad stump, on January 12th, 1870.

Case 39. *Necrosis of left tibia; albuminuria; amputation at knee-joint; parts infiltrated with lymph; recovery.* (Reported by Mr. F. E. Barrow.)—Ed. L., aged fourteen, was admitted into Lazarus ward on the 7th September, 1868. His parents, two sisters, and four brothers, were alive; one brother had died of phthisis. He had never had rheumatic fever; but, when four years old, he had measles badly, and was ill for two weeks. A fortnight afterwards he had scarlet fever, and was ill with it for two months. His mother then noticed that his body became swollen; this was said to be due to debility, but the state of his urine at the time was not known. The left leg and knee became swollen, and pained him when he put his foot to the ground, giving way under him. He then walked with the aid of a stick. The leg was strapped, and he afterwards had a gutta-percha splint applied, but no improvement took place. Seven years before admission abscesses formed on each side of the patella; poultices were applied, but the wounds never healed, anasarca continuing all through. When admitted, the leg was flexed upon the thigh at an angle of 120 degrees, the foot being extended so as to be almost in a line with the leg. The tibia and fibula seemed to be slightly dislocated outwards and backwards. There was a slight motion in the knee-joint,

and the patella was fixed firmly to the outer condyle. The leg and foot were œdematous. Above the knee in front and on the whole of the inner side of the leg were cicatrices of old ulcers or sinuses; on the inner side, below the tuberosities, there were some openings still discharging. The skin in these parts was smoothed and glazed, and had a peculiar warty appearance.—Sept. 10: Urine loaded with albumen. Spleen rather large. Œdema in lumbar region and slight in right foot, besides the swelling of the diseased limb. There was slight systolic murmur at the base of the heart.—On the 15th, the leg was amputated at the knee-joint; the patella was removed. A small posterior and a long anterior flap were made, the popliteal artery being twisted. Carbolic-acid dressings were applied to the stump, after which he passed black urine. A week later permanganate-of-potash solution was substituted for carbolic acid. On the 28th the right testicle was swollen, but this disappeared ten days afterwards, when the whole of the left side of the face became swollen, and he suffered from diarrhœa. By the 12th of October he was very much improved, and walked about the ward with the aid of a crutch. On the 22nd the stump had all but healed; there was very slight discharge. Dry lint was applied. By the 26th the patient's stump had quite healed up, and he went out, his urine being still loaded with albumen. In 1870 this boy was still well, and his urine still contained albumen.

Case 40. *Disease of knee-joint; amputation at joint; recovery.* (Reported by Mr. Hanton).—Thomas N., aged sixteen, was admitted into Guy's Hospital on December 29th, 1870, under Mr. Bryant's care, with disease of the left knee-joint of ten years' standing. The knee was flexed at a right angle; the tibia displaced backwards into the popliteal space; limb atrophied from paralysis. On January 14th, 1871, Mr. Bryant amputated the leg at the knee-joint, making a long anterior and a shorter posterior flap, and twisting the arteries. Good union followed, indeed primary union, the boy leaving the hospital within the month with a capital stump.

Case. 41. *Old disease of knee; amputation through knee-joint; recovery.* (Reported by Mr. W. Lane).—Minnie H., an anæmic, sickly-looking girl, thirteen years old, was admitted into Lydia ward on March 4th, 1874. When two years old she had a fall which hurt her very much. Her leg began to swell, and she was brought to Guy's Hospital, where she remained some months. The leg was probed two or three times, and she was then moved about from one hospital to another. She was in May, 1872, readmitted into Guy's, when a bit of bone came away from the internal tuberosity of the tibia, and another piece shortly after from the same place. When admitted the

leg was flexed upon the thigh at an angle of 120°; the foot and leg were both rotated outwards. She had two swellings, one on the internal tuberosity of the tibia and the other below the patella; also a large glandular swelling occupying the popliteal space, and causing pain, especially during the night, disturbing her sleep. On March 5th the glandular abscess in the popliteal space was opened, some dirty-coloured pus escaping. Carbolised lint was inserted into the wound, and left there for two days, when it was removed. The patient was better and freer from pain for some time after this, but became much agitated upon finding that an operation was necessary. She, however, became weaker, and on the 24th a large hollow was found in the head of the tibia communicating with the joint. The leg was then removed at the knee-joint by one short anterior flap and a long posterior skin one, little blood being lost. The stump was fixed upon a splint and dressed with dry lint. There was fibrous anchylosis between the tibia and femur. Cartilage and a thick layer of fibrous material still remained on the tibia. It was necessary to make a short anterior flap on account of the opening over the head of the tibia. The communication of the epiphysis with the shaft was ossified. Temperature 99°; pulse 102. On the following morning she complained of feeling sick and of not having slept, so a subcutaneous injection was given, which gave her rest. On the 26th she was very drowsy, but there was no constitutional disturbance. Next day it was found that there had been a free discharge from the stump. The temperature was 98·4°, and the pulse 98. On the 28th the wound was dressed for the first time. There was a little burrowing in the posterior flap, and the pus made its way through the opening in it. The sutures were removed on the 30th; the wound was then progressing slowly, the burrowing being less. Up to this date the injections of morphia had been continued; they were now left off, and the patient did not sleep so well at night. On April 7th it was found that she had been progressing favourably. There was a little burrowing at the inferior extremity of the wound, which seemed to come from the lower part of the stump. The flaps were going on very nicely. On the 14th the patient's health seemed improving. The wounds had been dressed with gutta-percha strapping and lint, carbolic acid solution being washed over with a camel's-hair brush. On the 22nd there seemed to be more burrowing, and the skin on the posterior flap was breaking down in small round openings, but she was able to sit up and felt better. By May 7th the patient was able to go about on crutches, the healing process proceeding well; her appetite was good, and she slept well at night, although she suffered considerable pain. On the 19th the skin was contracting rapidly; there was

occasional jumping pain in the stump, accompanied by feverishness. On June 4th the wounds of the stump were healing, but the granulations did not look very healthy, and had increased a little in size; but the child was able to get about on crutches. Was much better on the 8th, and on the 16th left the hospital for a convalescent home, where she rapidly convalesced.

Case 42. *Acute ostitis and necrosis, disease of ankle- and knee-joints; knee displaced backwards; amputation at knee-joint; recovery.* (Reported by C. J. Symonds.)—Caroline E., aged twenty-six, was admitted into Lydia ward on the 29th October, 1873. She had always been weakly, and when young had suffered from an abscess on her head, together with weak eyes. Nine months before admission she felt a sudden pain in her right leg during the night. The next day her calf began to swell, and became red; her leg the ensuing night "bent up," and she was unable to straighten it. The swelling then increased, and she poulticed it for three months. It was then lanced over the tibia near the ankle, and a great deal of pus came away. Fresh abscesses subsequently appeared; and she was never able to leave her bed nor to straighten her knee. When admitted, her knee was bent nearly at a right angle; the tibia and fibula were displaced backwards; there were several openings along the line of the tibia from knee to ankle, dead bone being seen at one place for an inch, and here a small artery could be seen pulsating. There was no movement in the knee, and the ankle was not of much use. There was a good deal of pain in the leg, and considerable discharge. On Nov. 7th the patient was placed under chloroform, the leg was bandaged with an elastic bandage from the foot upwards, and Esmarch's india-rubber band tied above the knee. Amputation was then performed at the knee-joint. Partial anchylosis had occurred. The extremity of the internal condyle of the femur was removed, the other parts being healthy. The popliteal artery was ligatured, and torsion applied to others. The stump was fixed upon a splint, and the wound dressed with dry lint, covered with cotton wool. Pulse 112, small and feeble; temperature 99·2°. She had a quiet night and slept well, but felt sick; she, however, was able to take milk, wine, and beef-tea without vomiting. She had a little head-ache on the 9th, which continued.—28th: She had progressed without interruption, excepting the nausea after eating and occasional pains in her leg, principally in the night. The flaps had now nearly united, there being some slight discharge coming from the natural opening left in the anterior flap.—Dec. 13th. She had suffered a great deal of pain in the stump, especially at night. Had felt very sick, and vomited on the 9th. She was able to

sleep but very little, and had slight diarrhœa. Poultices had been applied to the stump, which relieved the pain; but the nausea still remained, as did also the diarrhœa.—22nd: The leg was improving, only a slight discharge appearing; the diarrhœa had ceased, but returned again, and continued up to the date of her discharge from the hospital. She had also suffered a good deal from pain in the abdomen and shooting pain in the stump, which disturbed her rest. She was, however, able to get up on the 2nd of January, 1874, looking much better, and left the hospital on the 3rd. One month later she was well and about.

Case 43. *Chronic osteo-arthritis of knee-joint; amputation at the joint; recovery with an excellent stump.* (Reported by Mr. Bottamy.)—Thomas S., aged forty-eight, a porter was admitted into Guy's Hospital, under the care of Mr. Bryant, with extensive disease of the right knee-joint. He had been a healthy man till ten years ago, when he had scarlet fever, and after that he had been subject to rheumatism. Two or three years ago he first noticed some swelling in his right knee, and this had gradually increased. For some months he had been unable to walk or work. On admission the right knee was much swollen: it measured in circumference 21½ in., the left measuring only 14¼ in. The condyles of the femur were immensely enlarged, and crests of new bone surrounded the condyles. The inner condyle was much longer than the outer. The head of the tibia was expanded and altered in shape. The leg was like a flail; it could be moved and bent in any direction: all its ligaments were gone. Amputation was suggested and consent obtained, it being clear that nothing less was of use; and with such a limb, however artificially supported, the man could not work. It was consequently performed by Mr. Bryant on January 11th, 1870, the leg being taken off at the knee-joint, with a long anterior and a shorter posterior flap, the arteries being twisted. The operation was followed by little or no con-tit utional disturbance, and convalescence went on steadily and well. It was retarded a little by the exfoliation of a small shell of bone from the edge of the internal condyle of the femur, but nothing more, and the formation of one or two abscesses; but he left the hospital on March 25th with a strong stump that could bear any reasonable amount of pressure, and could support his body. As an example of amputation at the knee-joint it was very good; but, considering the condyles of the femur were expanded and thickened from rheumatic disease, the result was most satisfactory. The head of the tibia after the amputation was seen on its inner half to have been ground down for more than one inch by the inner condyle of the femur. All the articular cartilages were gone.

Remarks.—These eight cases are, I think, enough to prove the proposition I have advanced. In Case 36—one of disease of the knee secondary to disease of the tibia, that occurred in 1863—I wrongly amputated above the knee, and as a consequence had a secondary ostitis and necrosis to contend with. Had I at that time my present knowledge, I should have taken the leg off at the knee-joint, when no such complication as I have recorded would probably have taken place. In cases 37 and 38, both of disease of the knee, the flaps were brawny, and yet a rapid repair followed; the division of tissues infiltrated with inflammatory products having no injurious influence. In Case 39—one of disease of the knee-joint—albuminuria complicated the treatment, and yet no bad result followed an amputation at the knee-joint. In the other cases, four in all, amputation at the knee-joint was performed through the diseased tissues, with a good result. In all the cases the diseased parts were alone removed; no healthy tissues were sacrificed for the sake of the operation; and in all good results ensued.—*Lancet, Jan.* 30 *and Feb.* 20, 1875, *pp.* 154, 263.

35.—ON A MODIFICATION OF THE METHOD OF USING MALGAIGNE'S SCREW-HOOKS IN TRANSVERSE FRACTURE OF THE PATELLA.

By James Spence, Esq., F.R.S.Ed., Professor of Surgery in Edinburgh University.

Although the screw-hooks designed by M. Malgaigne for transverse fracture of the patella are perfect as a mechanical contrivance for maintaining the fragments in accurate apposition, they have never yet been very generally used, owing to the pain and irritation caused by their sharp points when inserted through the skin into the broken fragments of the bone. Of late years I have adopted a method of using these hooks, which I find to answer the purpose admirably, without inserting the hooks through the integument. The two fragments of the patella being held by an assistant in as close apposition as the effusion in the knee-joint will permit, I apply a broad piece of strong moleskin adhesive plaster of the shape shown in Figs. 1 and 2 A to the thigh above the upper fragment of the patella, and another piece of plaster of the shape shown in Figs. 1 and 2 B from the upper part of the leg to the lower fragment of the bone. On the space marked C in the figures two or three layers of plaster are applied to protect the skin from the points of the hooks, which are inserted there above and below the fracture as shown in Figs. 3 and 4. The

screw is then gradually tightened, and the fragments are approximated and kept in apposition. The screw requires to be

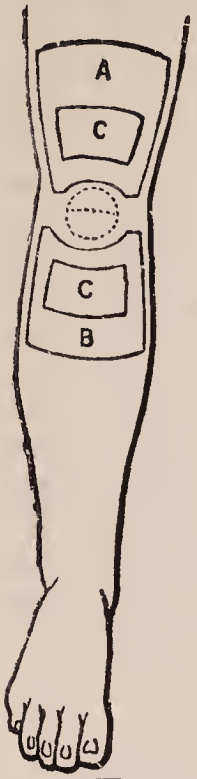


FIG. 1.

FIG. 2.

tightened from time to time, and thus the fracture is kept accurately adjusted and in close apposition without any circular

FIG. 3.

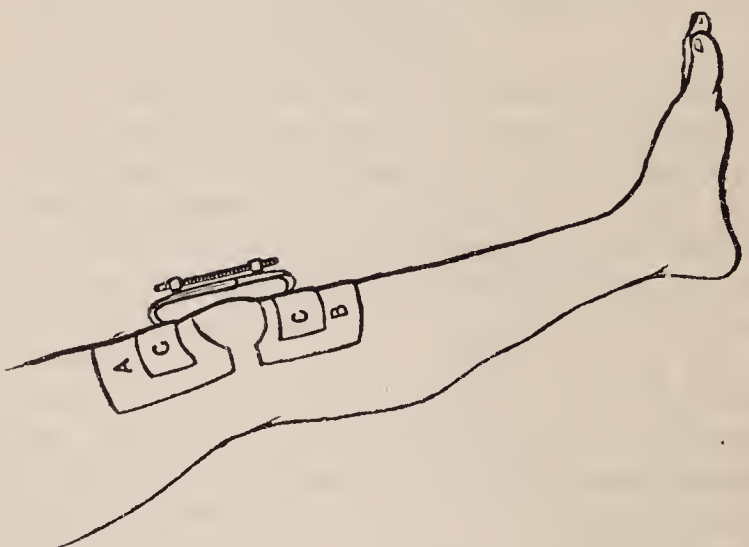


FIG. 4.

constriction of the limb. Care must be taken to have the integuments on the stretch when the plasters are applied. The plasters should not be much heated, otherwise they would be liable to slip, and they should be firmly adherent to the skin for some time before the hooks are inserted, or traction made on them by using the screw. For greater security against the plasters slipping, the main portions may be made sufficiently long to encircle the limb, and supported for twenty-four hours with a few turns of a roller. I prefer, however, the method described, as the plasters, if carefully applied, generally hold firmly, and should they yield they can be easily reapplied. I may mention that I have also tried this method in treating rupture of the ligamentum patellæ, but it does not answer so well in that injury as plasters with straps, one passing on either side of the patella, from the upper plaster to buckles fixed on the lower plaster. In both these injuries the limb should be placed on an inclined plane, or, better, slung at a corresponding inclination.—*Practitioner, March* 1875, *p.* 183.

36.—THE TREATMENT OF FRACTURES OF THE PATELLA AND OLECRANON BY THE EXPECTANT METHOD.

By Arthur Fergusson M'Gill, Esq., Surgeon to the Leeds Public Dispensary.

It may be taken as an axiom in medical and surgical practice that the treatment of those diseases and injuries for which many remedies have been advised is as a rule unsatisfactory. For example, many drugs have been used in the treatment of tetanus and hydrophobia, and it would be impossible to name two diseases in which treatment is of less avail. In a minor degree this remark applies to the treatment of fracture of the patella. There is no fracture to which a greater variety of splints and apparatus has been applied, and yet the results are by no means satisfactory; bony union is of rare occurrence, and consequently the affected limb rarely becomes as strong as it was before the accident. It has fallen to my lot to see, and have more or less under my care as a house-surgeon, a considerable number of these fractures. The treatment adopted has been chiefly of four kinds.

(1). Malgaigne's hooks, of which I need only say that though they are theoretically of great value, practically their use is found to be attended with considerable danger. I well remember a case which occurred in King's College Hospital during the winter of 1864. The patient was a drunken woman who sold play-bills in Drury Lane. She was admitted with fracture of the patella; the hooks were applied with great skill and care,

but erysipelas and diffuse cellular inflammation supervened, and she died from the effects of the treatment.

(2). Professor Wood's method, by a figure-of-eight bandage passing through hooks on the under surface of the splint. Though by this means the fragments can be closely approximated, yet, owing to the direction in which the bandage is applied, the fragments are tilted forwards, and consequently placed in a position which does not favour union.

(3). Samborn's method. A pad being placed above and below the broken fragments, a long strip of plaster is applied on the anterior surface of the thigh and leg, extending from the hip to the ankle; a loop is left over the knee-joint, and into this a stick is inserted; by twisting the loop by means of the stick, the pads are brought together and drag the fragments of the patella with them. By this means they can be closely approximated, and this without any objectionable tilting. The results obtained by this plan of treatment are excellent.

(4). The plan of treatment adopted by Mr. Pridgin Teale does away with the necessity for any special apparatus, and combines the two great desiderata, simplicity and efficiency, and I think may with propriety be designated the "Expectant Treatment." Mr. Teale has most kindly allowed me to take the two following cases from his notebook at the Leeds Infirmary. They are the first two cases in which this method was adopted, and well exemplify the treatment.

A railway porter, aged 26, was admitted into the Leeds Infirmary Dec. 22nd, 1865, under the care of Mr. Teale. While moving a large iron wheel, it fell over and knocked him down, striking his knee as it fell. He was unable to walk, and was immediately brought to the Infirmary. On examination it was found that the patella was fractured transversely about its centre, and that the fragments were separated for half an inch; the joint was much swollen. The leg was placed on a pillow and slightly bent between sandbags, and evaporating lotion was applied. By Jan. 12th the distance between the fragments had diminished to one quarter of an inch; by Feb. 4th they were almost touching; on Feb. 11th the patient was allowed to get up with a starch bandage on; and on Feb. 20th he was made an out-patient, the fracture being united without any perceptible interval, apparently by a band of strong fibrous tissue.

The next case is even more striking. A dyer, aged 43, on Jan. 23rd, 1867, fell on his knee, striking it violently against a stone; he was brought the same day to the Leeds Infirmary, and was admitted under the care of Mr. Teale. A fracture of the patella was discovered, but owing to the large amount of effusion in the joint, the distance between the fragments could

not be ascertained with certainty. The leg was placed on a straight splint, with the heel slightly raised, and evaporating lotion was applied. In five days (Jan. 28th) the effusion had much subsided, and from this date the interval between the fragments was measured with great accuracy. The measurements were as follows:—Jan. 28th, $1\frac{1}{4}$ in.; Feb. 4th, $1\frac{1}{16}$ in.; Feb. 11th, $\frac{3}{4}$ in.; Feb. 18th, $\frac{1}{2}$ in.; Feb. 25th, $\frac{3}{8}$ in.; March 4th, $\frac{1}{4}$ in. On March 11th the splint was removed, and a knee-cap of chamois leather having been fitted accurately to the joint, he was made an out-patient; the union being apparently strong and fibrous.

Since the above date Mr. Teale has treated all cases of fracture of the patella in a similar manner, and I can testify that in those cases in which I have seen it adopted the result has been equal to that which can be obtained by any other plan, while the comfort of the patient has been much greater. It is a matter of but little consequence whether the limb be placed on a straight back splint, or on a pillow between sandbags. In either case the patient should be confined to bed for six or eight weeks, and when allowed to get up should be fitted with a soft leather splint, which will limit but not arrest the movements of the joint.

Three reasons can be assigned for the gradual approximation of the broken fragments:—(1) At the time of the injury the quadriceps extensor is thrown into a state of tonic contraction; after a few days this contraction relaxes, and the muscle gradually regains its normal length, thus removing all traction from the broken bone. (2) The effusion which always occurs at the time of the accident is slowly absorbed, and by its removal allows the fragments to fall together; and (3) the fibrous band which is formed between the opposing surfaces has, like all other cicatricial tissue, a tendency to contract, and thus to complete the approximation.

Fracture of the olecranon is both a less severe and less frequent accident than fracture of the patella. The union is occasionally bony, but usually by fibrous tissue. In the latter case the movements and usefulness of the arm are but slightly, if at all, impaired. Before I was aware of Mr. Teale's treatment for fracture of the patella as described above, I was in the habit of treating these cases by placing the arm on a rectangular splint in a semiflexed position. The results obtained in this way are as good as those obtained by any other method. Bony union will occasionally occur, as the following case will show. In 1870 I had under my care a boy, aged 14, who had fractured his olecranon process by a fall on the elbow. The upper half of the process was freely moveable with crepitation, but was not removed far from its normal position. The arm

was kept on a rectangular splint for a month. The fractured piece was then firmly united to the shaft, and it was only by a careful examination that the seat of the fracture would be detected. In other cases the result has not been so good as this, but in all there has been a gradual approximation of the broken fragment to the shaft, similar to that described above as occurring in fracture of the patella. The comfort of the patient is much greater than if the arm were kept in an extended position; and if anchylosis should occur, as it is reported sometimes to do, the limb would be in a useful and not in a useless position.—*Practitioner*, *March* 1875, *p.* 188.

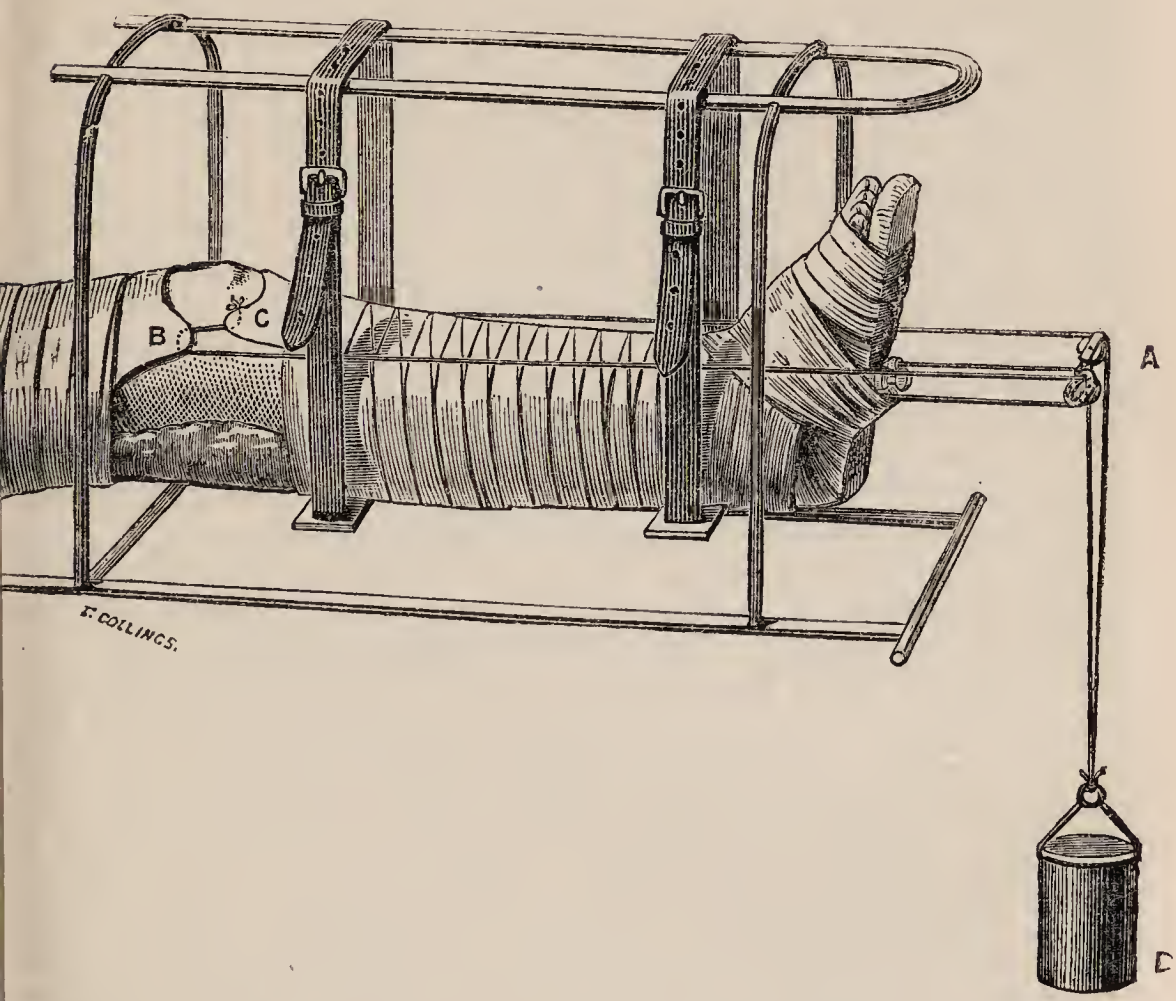
37.—ON THE TREATMENT OF FRACTURE OF THE PATELLA.

By Geo. W. Callender, Esq., F.R.S., Surgeon to St. Bartholomew's Hospital.

The accompanying woodcut illustrates the plan of treating transverse fracture of the patella which has been employed for some years in my wards. Since referring to this method in the last volume of our Hospital Reports, several cases have been under treatment with good results, not only as to the close approximation of the fragments, but by the establishment of such firm union as simulates, if indeed it be not repair by true bone formation. I think the arrangement we employ has an advantage over the plan, which is advocated in America by Dr. Lewis, of drawing together the two portions of the bone by means of long strips of plaster, because it enables continuous traction to be made in a horizontal line with the patella, and consequently there is less risk of tilting forward the broken edge of either fragment when traction is established.

The following is the manner of applying the apparatus:—"A day or two after admission the limb is placed on one of Neville's splints, to the foot-piece of which is clamped an iron, with two arms projecting beyond the foot-piece, at the end of each of which a pulley is fixed (A), a line from which will fall clear of the foot of the bedstead. A piece of ordinary adhesive plaster is applied to the front of the thigh, its distal end being curved to fit the upper margin of the patella, each horn of the crescent being arranged so as to form a loop (B). The edge of the plaster is protected by a strip of lint to prevent it from irritating the skin when under traction. A similar provision is made for the leg and for the lower fragment of the patella (C), and both pieces of plaster are further secured by bandages passing over them and round the Neville splint. If a piece of cord is attached to each of the loops at the horns of the lower plaster (C), and is then passed through the upper loops (B),

and is thence carried to the pulley at the end of the outrigger, below which the two cords may be united and made to support a weight (D), it is evident that the entire weight-traction will draw the horns of the two crescents together and approximate the fragments of the knee-cap. The cutting out and adapting of the pieces of plaster require care and some



practice, and from time to time these may need to be readjusted; but the whole arrangement is simple, and, I think, is worth further trial."

If there is any difficulty in obtaining the Neville splint and the iron clamp, a splint of wood with holes drilled (at a level to be determined on in each case) through the foot-piece to carry the cords will suffice as a substitute, or a pulley may easily be fixed to either side of such a foot-piece. It is necessary that the plaster should hold firmly. We find that which is in use at the Seamen's Hospital at Greenwich one of the best in this respect.—*Practitioner, March* 1875, *p.* 186.

38.—THE TREATMENT OF CHRONIC BURSITIS PATELLÆ, AND ON ANTISEPTIC SURGERY GENERALLY.

By Joseph Lister, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

The effect of an accumulation of serum in keeping up inflammatory disturbance, and the usefulness of the drainage-tube combined with antiseptic management under such circumstances, are well exemplified by chronic bursitis patellæ, with fluid effused into the sac. The skin being washed with 1 to 20 carbolic lotion, a puncture is made under the spray with a tenotomy knife, sufficient for the introduction of a drainage-tube scarcely larger than a crowquill, care being taken that it penetrates fairly into the cavity of the sac, which often lies at a considerable depth in consequence of thickening of the membrane and of surrounding textures. The narrow drainage-tube may be readily inserted by means of a simple modification of the dressing forceps introduced by myself several years ago, but hitherto unpublished. The blades, which are straight, are ground down to the size of a probe at their extremities, so that they can be passed into a very small orifice. This instrument, which goes by the name of sinus-forceps among the Edinburgh instrument-makers, will be found very useful for extracting small exfoliations and for various other purposes.

The clear fluid contents being all pressed out of the sac, a gauze dressing is applied, and retained in position with a figure-of-8 bandage. The dressing being changed next day, the gauze is found considerably soaked with serous discharge, but, if the tube is acting efficiently, nothing can be pressed out of the cavity. And it will very likely be found that the end of the tube is projecting slightly above the level of the skin, and cannot be pushed in again to its original position, so that it is necessary to shorten it a little. This depends on the fact that, even within twenty-four hours of the opening of the sac, the chronic thickening of the textures has markedly subsided. The same thing will be probably still more apparent when the dressing is again changed after forty-eight hours more, when also the serous stain on the gauze resulting from two days' discharge will be only a small fraction of that seen after the first twenty-four hours. The tube being shortened to the requisite degree, the dressing now applied might be left untouched for a week so far as regards the purpose of ensuring absence of putrefaction; but it will be well to expose the part again in two or three days in order to ascertain whether or not the drainage-tube may be dispensed with; the rule being that it should be continued so long as the serous stain on the gauze is more than the puncture, as distinguished from the interior

of the sac, would account for. This is probably the case within a week of the opening of the bursa; and then, the drainage-tube being discontinued, and a small piece of protective being interposed between the puncture and the gauze so as to permit cicatrisation, the little sore will be found completely healed in the course of another day or two. At the same time the sac will be free from any fluid accumulation, and the surrounding thickening either quite gone or quickly disappearing.

While we have thus a sure, speedy, and (except the infliction of the puncture) a painless method of remedying a troublesome complaint, the results are of considerable theoretical interest. It is plain that the antiseptic employed does not penetrate into the bursa, so as to exert any direct action on the part affected. All that the treatment does is, while guarding against the access of putrefactive fermentation, to provide that the plasma poured out from the synovial surface shall flow freely away as fast as it is effused and never accumulate in the cavity. Yet when these conditions are complied with, the obstinate chronic inflammation, which has perhaps already resisted rest and counter-irritation, immediately proceeds to subside, the morbid tendency of the synovial membrane is soon entirely lost, and the surrounding inflammatory thickening is dispersed. It follows therefore that the presence of the fluid within the sac was of itself sufficient to perpetuate for an indefinite period the state of chronic inflammation. And this fluid being the bland liquor sanguinis, perfectly destitute of chemically irritating qualities, the only possible way in which it could have produced its effect is by mechanical disturbance occasioned by its presence in the sac. In other words, the agency by which the chronic bursitis was maintained was that which, next to putrefaction, is the commonest of all causes of inflammation in surgical practice—viz., tension. Yet, in cases of this kind, the sac is by no means always extremely distended; but, flaccid though it may be, the fluid present in it keeps up by its mechanical influence the tendency to abnormal effusion from the synovial surface and inflammatory hypertrophy in the surrounding tissues. It seems to me important that this point should be capable of being thus clearly demonstrated; because the knowledge that a flaccid collection of liquid acts as a cause of disturbance not only serves to explain the obstinacy of chronic serous and synovial effusions, but throws light upon other important matters, such as the prejudical effect of even a slight accumulation of serum within a wound, as in the aneurism case above related, or the influence of the presence of the contents of a slack chronic abscess in maintaining suppuration from the pyogenic membrane. And, conversely, this knowledge enables us to understand the benefit often obtained by simply evacuating serous or

purulent collections, either as a single remedial measure or as a preliminary to counter-irritation.

When the evacuation is effected in such cases by means of the aspirator, the piercing canula should be dipped into carbolic oil before introduction. And if, as is often the case, the narrow tube becomes obstructed by lymph or curdy material, there is no objection whatever to the use of an ordinary canula and trocar of any size that may be necessary, provided that the instruments be smeared with the antiseptic oil and the operation be performed under the spray. In abscesses, however, according to my experience, a cure rarely results from evacuation of the contents by an opening which is allowed to close. The plasma which exudes from the pyogenic membrane after withdrawal of the pus will, if retained, nearly always occasion sufficient tension to reproduce suppuration. But if it be allowed to flow freely away through a drainage-tube, under an antiseptic dressing, the pyogenic membrane being freed from the disturbing cause which urged it to perpetual suppuration before the abscess was opened—viz., inflammatory excitement occasioned by tension (greater or less according to the degree of acuteness of the case), while the granulating sac is protected from the new stimulus to which it would be subjected if the abscess were opened without antiseptic measures—viz., the chemical irritation of putrefying material.—the beautiful sight is witnessed of cessation of suppuration from the moment that the original pus is evacuated, the serous discharge diminishing constantly till the abscess cavity is closed.

If antiseptic treatment had done nothing more than create such a revolution in the treatment of abscess and throw such light upon its pathology, it would have well deserved the gratitude of the surgeon.

But in order that such results may be obtained, it is necessary that both the above conditions be complied with—viz., a perfectly free outlet for discharge, and thoroughly efficient antiseptic management from first to last. If the former condition be not fulfilled, inflammatory suppuration from tension will occur; or if the accumulation of fluid be only to a very slight extent, increase or persistence of serious oozing will be the result. And if the latter essential fail to be maintained—as for example, through inefficiency of the retaining bandage, allowing the dressing to become loose or displaced, or through the antiseptic treatment being given up too early, before the sinus has completely closed,—septic suppuration will take place, with its various consequences, such as free incisions and counter-openings, or, in vertebral or articular disease, disaster varying according to the circumstances of the case.

A sponge wrung out of a strong watery solution of carbolic acid (1 to 20) forms a valuable aid to the drainage-tube in preventing, during the first twenty-four hours, the accumulation of blood in wounds having a considerable cavity, such as those left after the removal of tumours. The wound having been stitched and the drainage-tube (or tubes) inserted, a strip of oiled silk protective is laid along the line of incision to keep it moist, and so prevent the sponge from adhering. A soft sponge large enough to cover the entire cavity of the wound and purified as aforesaid, is then applied, and over it a gauze dressing sufficiently extensive to reach several inches beyond the sponge in every direction. The whole is retained in position by a pretty firm bandage, so as to bring into play the elasticity of the sponge, which keeps the surfaces of the wound in apposition, and, while checking sanguineous effusion, compels that which does occur to escape by the drainage-tube, when it is at once sucked up by the sponge as it oozes from beneath the protective.

If anyone desires proof of the potency of a strong watery solution of carbolic acid to deprive septic ferments of their energy, he cannot do better than consider the results of this mode of dressing. The same sponges are used over and over again till they wear out, and for hospital purposes they are kept always steeping in the carbolic lotion. But in private practice the plan which I have pursued for several years is the following:—The sponges, after being used for an operation, are put into a vessel of water and left there till the fibrine in their pores has been converted by putrefaction into a slimy liquid which can be readily washed out. They are then squeezed in successive portions of water till they cease to discolour it, and, after having been well wrung, they are thoroughly moistened with the 1 to 20 watery solution of carbolic acid. The sponges after being so treated have, very likely, a decided putrefactive odour clinging to them; but this is a matter of no moment. The presence of a little of the *products* of putrefaction will do no harm if the *causes* of the fermentation have been destroyed. And that such is the case is evident from the following considerations:—The sponge, being squeezed as dry as possible when applied, contains but little of the solution of carbolic acid with which it was treated, and this is soon displaced from the parts next the wound, or at least copiously diluted by the effused blood and serum, which are often in such quantity that the red liquid can be wrung out of the sponge when it is removed on the following day. If therefore any septic ferment were present in an active state in the deeper parts of the sponge, the bloody serum could not fail to putrefy, since there is certainly not a sufficient proportion of carbolic acid mixed with it to act

as an antiseptic. Yet, in point of fact, putrefaction never does occur in the sponge (provided, of course, that all the proceedings have been, in other respects, conducted antiseptically), and I cannot call to mind a single instance of such an occurrence either in private or hospital practice. It follows that no active septic ferment is present in the portions of such a sponge which become soaked with the serum. Yet before the sponge was treated with the solution of carbolic acid it contained such ferments in abundance; for, not to speak of the residual putrid material left after the often hasty and imperfect washing, the very water with which it was washed teemed with septic ferments, as was clearly demonstrated some years ago by Dr. Burdon Sanderson. How, then, had they been got rid of? They could not be all washed out like the carbolic acid, because, as will be shown in the next paragraph, they are not matter in solution, but solid particles, which must remain entangled in abundance in the porous material of the sponge. The only other possible way in which they can have been disposed of is by the action of the carbolic acid upon them. And thus we are led inevitably to the conclusion that this agent, applied in the form of a strong watery solution, completely and permanently extinguishes the septic energy of putrefactive ferments.

That the septic ferments are solid particles, not material in solution, might be pretty safely assumed from analogy, if it were granted that they are living organisms; though, indeed, I once heard it propounded in conversation by a very sound and eminent chemist that, for aught we could tell to the contrary, living matter in its lowest forms might exist in a soluble condition—an idea suggested by Dr. Sanderson's statement that a drop of water in which no bacteria could be discovered by the microscope will nevertheless give rise to the development of such organisms when added to a liquid adapted for their growth. But those who hold that the septic agents are not organisms at all, but so-called chemical ferments, might with greater justice contend for their possible solubility. The point being of great practical as well as speculative interest, I have been glad to obtain conclusive evidence regarding it from some simple experiments lately performed, and hitherto unpublished. I must content myself on the present occasion with briefly indicating their character.

A series of experimental glasses, contrived so that their contents shall be securely protected from dust, though the atmospheric gases gain free access to them, having been purified by heat, are charged with some liquid, like boiled milk, favourable for organic development and prone to fermentative changes, but uncontaminated at the outset by the presence of any living organism. If the glasses so arranged are left undisturbed, the

liquid remains unaltered for an indefinite period, except that its bulk is slowly diminished by evaporation. But if a minim of ordinary drinking-water is added to any one of the glasses, its contents will in a few days be obviously altered in chemical character, and before long will probably be decidedly putrid, the microscope at the same time revealing abounding bacteria—a result in perfect accordance with Dr. Sanderson's observations. If, however, instead of an entire minim, a small portion (say a hundredth) of a minim of the same water is added to each of a series (say ten) of such glasses (which can be readily done by means of a small syringe, having its piston-rod in the form of a fine-threaded screw, on which a graduated disc revolves to regulate the amount of liquid emitted from the slender glass tube that constitutes the nozzle of the instrument), a very different result ensues. Some of the glasses probably remain permanently unchanged, as if nothing had been added to them; and those which do experience alteration show plainly, by differences of colour and smell, that they are undergoing various kinds of fermentation, while the microscope shows corresponding differences in the characters of the bacteria found in them.

It is hardly needful to remark that if the ferments were dissolved in the water they would be equably diffused through it, and the same effects would be produced in all the glasses by the addition to each of the same quantity, however small. It is thus conclusively shown, so far at least as regards the fluids which I have hitherto made the subjects of experiment, that the material in water which leads to putrefaction or other fermentative changes in an organic liquid is not in a state of solution, but in the form of suspending particles, various in kind, and though present in great numbers, by no means equably diffused, but scattered through the water at various distances, like the amœbæ or other animalcules which people it. This will, I believe, be found to be a sure and important step in proof of the theory upon which the antiseptic treatment is based. But a practical paper like the present is perhaps hardly the proper place for discussing its bearings in this respect.—*Lancet*, *April* 3, 1875, *p.* 468.

39.—ON A NEW FORM OF "BOOT" FOR THE TREATMENT OF TALIPES EQUINUS.

By Thomas Annandale, Esq., F.R.S.E., Surgeon to the Royal Infirmary, Edinburgh.

The boot was made, at my suggestion, by Mr. Hilliard in September 1870, in connexion with the treatment of a case of talipes equinus. Since then the appliance has proved so suc-

cessful in treating cases of this deformity in my own practice and also in the practice of others, that I recommend it with much confidence to the consideration of my professional brethren.

I have used it under three conditions:—1. Without any division of the tendo Achillis. If the distortion is not very severe, the application of the boot without any operation is perfectly successful. One interesting case, treated under this head, was that of a little girl, both of whose feet were affected with the deformity. The apparatus was applied to both feet, and resulted in a complete cure.

2. With division of the tendo Achillis, and, if necessary, the plantar fascia. In aggravated cases the division of one or both of these structures is usually required, and when the wounds are healed the application of the boot gradually stretches the contracted ligaments and other textures, and so completes the cure.

3. With removal of the head of the astragalus in addition to the division of the tendo Achillis. In one very aggravated case it was found impossible to relieve the deformity, owing to the displacement and projection of the head of the astragalus on the dorsal surface of the foot. I accordingly excised this portion of bone, divided the tendo Achillis, and when the wounds were healed, applied the apparatus until the deformity was relieved.

A short description of the boot will be sufficient to make its principle understood. It consists of a footpiece and leg-support, which are connected together by a movable joint on each side, so as to allow of flexion and extension of the ankle-joint. The essential part of the appliance is the screw at the back, which is turned by means of a key. When the screw is turned in one direction it elevates the heel, and the appliance can in this way be adapted accurately to the deformed foot. By turning the screw in the opposite direction, the heel is depressed, and the relief of the distortion gradually and efficiently accomplished by acting upon the contracted tendo Achillis and other textures.

The appliance can either be fitted to an ordinary lacing walking boot, or the foot may be secured to the footpiece by a padded strap crossing over the dorsal surface of the foot and ankle. Sometimes I use a lacing boot of soft leather, similar to that employed in my boot for talipes varus, to secure the foot. In aggravated cases, or in those requiring operation, a combination of the two latter methods is best. The leg is fastened to the leg-support by a broad padded belt passing round the limb at its upper third.—*Edinburgh Medical Journal, Feb.* 7, 1875, *p.* 700.

40.—ON RECENT IMPROVEMENTS IN THE DETAILS OF ANTISEPTIC SURGERY.

By Joseph Lister, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

[Various improvements have from time to time suggested themselves in the means of carrying out the antiseptic principle. After trying a weaker solution of carbolic acid, the 1 to 40 lotion has been returned to, while the saturated watery solution (1 to 20) is still employed for purifying the epidermis of a part about to be operated upon, and for washing accidental wounds. "For cases of compound fracture seen for the first time several hours after the accident, I have of late used a still stronger antiseptic in the form of one part of carbolic acid dissolved in five parts of spirit of wine, introduced into the recesses of the wound by means of a gum-elastic catheter connected with a syringe by a piece of caoutchouc-tube. In this way the antiseptic is made to penetrate the coagula in the various parts of the wound more effectually than it could be by forcing it in through the external orifice, while at the same time we avoid the needless disturbance which this procedure may entail in consequence of the irritating liquid being driven for a greater or less distance through the cellular interstices of uninjured parts."]

A solution of carbolic acid of the strength of 1 to 40 is that which I would advise for providing an antiseptic atmosphere in the form of spray when the particles of the liquid are dispersed by means of air impelled by hand-bellows or a condensing pump. But I have of late found it more convenient to use high-pressure steam as the motive power, on the principle of Siegle's steam inhaler, the apparatus, modified to adapt it for our purpose, being both self-acting and self-directing, so as to dispense with the services of an assistant. But in this case the water of the condensed steam dilutes the solution with which it becomes blended in forming the spray, so that it is needful to use a larger proportion of the acid. In the machines hitherto constructed one part of water is consumed by ebullition for three parts of solution sucked up to mingle with it, and thus 1 to 30 is the proper proportion of the acid in order to form a 1 to 40 spray.

(Different steam spray-producers may differ in this respect in consequence of slight variations in the relative sizes of the orifices for emitting the steam and lotion respectively. It is therefore right that in every case the actual proportion between the steam and solution consumed should be ascertained by the maker, and stated to the surgeon. In absence of such informa-

tion the surgeon can readily settle the point for himself by working the spray for a while with given quantities of water in the boiler and lotion in the bottle, and then measuring the amount remaining in each vessel.)

As a dressing for excluding putrefactive fermentation from wounds, the antiseptic gauze, which contains in its fibres carbolic acid stored up in common resin, which is of course insoluble in the discharges and holds the acid with great tenacity, has continued to prove thoroughly trustworthy if properly used; so that, provided always we have the essential condition of a sufficient space of skin in every direction from the wound for the gauze to cover, we may be quite sure that a wound left free from the causes of putrefaction when dressed, will be found similarly aseptic when we change the dressing—a fact which no one, perhaps, who has not gone through the labours and anxieties which have fallen to my lot in striving after its attainment can fully appreciate. Under ordinary circumstances we still use the gauze in eight layers, with a sheet of some trustworthy impermeable tissue placed beneath the outermost layer to prevent the discharge from soaking directly through the dressing, for if it did so a copious effusion might wash out the antiseptic from the part immediately over the wound and putrefy within twenty-four hours. The most durable and therefore most reliable material for the purpose, consistent with the requisite lightness, is a fine cotton cloth with a thin layer of caoutchouc on one side, known in the shops as hat lining or thinnest mackintosh. This, if of good quality, may be used for the same case for weeks together. But, unless particular care is taken with its manufacture, the caoutchouc layer tends to adhere in the folds which it acquires from the various altered positions of the dressing, and portions of it may then be torn off when the folds are straightened out, thus destroying the essential property of impermeability; and if the mackintosh be still used in that condition, entire failure of the dressing may result.

I have just now under my care a case in which I opened antiseptically an abscess connected with disease of the hip-joint, where all went on typically for a considerable time, the discharge being merely serous, and so diminished in quantity that the dressing was left unchanged for several days together, when, in consequence of imperfection of the mackintosh, the discharge was observed to have soaked directly through the dressing opposite the wound, and, apparently as a result of this, putrefaction had crept in, which soon led to profuse suppuration and hectic, necessitating excision of the hip-joint.

It is therefore needful to have this material specially prepared

to obviate the tendency to adhesiveness. And in all cases a second piece of the mackintosh should be at hand, so that when one piece is observed to become impaired by wearing, the other may be substituted for it.

The mackintosh having no antiseptic property except mechanically by its impermeability, but, on the contrary, being, like other indifferent materials, covered more or less with septic matter, it is necessary, when the dressing is a compound one, or in other words consists of more pieces than one, that the mackintosh be well covered in at the place of junction of the two pieces, for if it were allowed to project uncovered in the vicinity of the wound, it might communicate septic mischief.

As an example of a compound dressing may be given one which, from the frequency of the cases requiring it, is the most important of all—viz., that used after removing the mamma. In consists of two pieces of folded gauze and mackintosh, a posterior and an anterior one. The posterior portion is about half a yard square, and reaches vertically from above the acromion to a little below the elbow, and transversely from the spine to the arm, which it envelopes as it lies beside the chest, thus forming a complete antiseptic basis for the region of the shoulder, and effectually guarding against what would otherwise be most difficult to avoid, the extension of putrefaction from the bedding through the axilla into the outer angle of the wound. The anterior dressing, though not so broad as the posterior one, is of about equal length, so that when applied to the chest it may reach from some inches beyond the anterior angle of the wound to the posterior dressing, which it joins below the back of the axilla; and here it is that it is needful to have the mackintosh well covered in among the folds of the gauze. The infra-axillary region being the part where the chief discharge occurs, it is of the utmost importance that the outer part of the anterior dressing be maintained well in apposition with the skin, and this is ensured by stuffing a substantial mass of gauze irregularly packed together between the patient's side covered by the dressing and the lower part of the arm. This additional mass of gauze has the further advantages that it serves as a supplementary antiseptic material to absorb the discharge, and that it prevents the arm from being closely pressed to the side—a position which, besides being irksome to the patient, would entail the serious evil of interference with free drainage from the outer angle of the wound. In order to prevent the occurrence of bedsore over the external condyle a wisp of gauze, twisted and rolled together in the form of a ring, is placed beneath the elbow so as to receive the bony prominence in its hollow. The whole dressing is secured in position by

suitable turns of a gauze bandage, which is extremely convenient on account of its lightness, and also from the circumstance that the slight adhesiveness of the material with which it is charged checks the tendency of one turn to slip upon another, so that it is more secure than a common cotton roller, besides the advantage that it increases the antiseptic efficacy of the dressing. But, on account of its loose texture, it cannot be properly fixed by ordinary pins, which would be liable to shift their position in it. Those called safety-pins, made on the principle of a brooch, should therefore always be employed; for there are cases in which the slipping of a single pin might, by allowing the dressing to shift its place, endanger the life of a patient.

There is another point in the use of the gauze to which I wish to direct special attention. The very quality which makes this material so valuable as a permanent antiseptic dressing, and renders it both mild and persistent in its effects—namely, the tenacity with which the resin in its fibres holds the carbolic acid—may become a source of serious danger at the time of application. For at ordinary temperatures of the air the antiseptic is given off by the gauze in such extremely small amount that particles of dust falling upon it cannot be expected to be deprived of septic energy by contact with it, as they are by a 1 to 40 watery solution. Hence, if a piece of gauze is applied dry to a wound communicating with a cavity containing blood, serum, or pus, as in a compound fracture, a stump after amputation, or an abscess, portions of septic material on the surface of the gauze may become mingled with the discharge at the outlet, and, thus shielded from the subsequent action of the carbolic acid, may spread fermentation into the interior. Had it not been for the use of the spray, which plays on the under surface of the gauze when applied, I cannot doubt that this cause would often have led to failure. But considering the very short time during which the spray often acts on the gauze, it is plain that it would be imprudent to trust to it for purifying the surface. This, however, can be done with the utmost readiness, either by wetting with the 1 to 40 lotion the part of the gauze dressing which is to go next to the wound, or, what is commonly more convenient, by applying to the wound itself a separate piece of gauze soaked in the lotion, and over this the dry gauze in its eight layers. When the discharge is slight, a single layer of this moist loose gauze is sufficient, but if it is copious the wetted portion must be substantial.

In situations where there is not as much extent of skin for the gauze to overlap as is desirable—for example, in the vicinity of the pubes, as after herniotomy—the deficiency of surface of

the dressing may be compensated by using the gauze in a thicker mass; say in sixteen or thirty-two layers. By this means such wounds may be securely kept from putrefaction, which with only eight layers it might be impossible to avoid.

Details like these, tedious as they are to describe, are of course very easy of execution, and attention to them will, I doubt not, be rewarded, in the hands of others as it has been in my own, by a constancy of results which leaves little if anything to be desired.

With regard to the times of changing the dressing, it is, as a general rule, prudent to inspect the wound the day after its infliction, whether it be accidental or the result of operation. But during the subsequent progress of the case the gauze may be left undisturbed for periods varying from two days to a week, in proportion to the diminution of effusion; the general rule being that the dressing should be changed on any day on which the discharge is observed to have extended beyond the edge of the folded gauze so as to make a stain upon the clothes or bedding.

Invaluable as the gauze is, I greatly regret to find that its use is restricted by the high price at which it is often sold. I will, therefore, now describe the manner in which it has been prepared for a long time past at the Royal Infirmary of Edinburgh, with the effect of reducing by more than half the wholesale price previously paid by the institution. First I may remark that the chief element in the cost is the cotton cloth, the expense of the materials with which it is charged being less than a farthing per square yard of the gauze. It is therefore of great importance to obtain the muslin as cheap as possible from the manufacturer, and a little saving is effected by having it unbleached. (Messrs. Lang and Cousin, 42, Ingram Street, Glasgow, supply the unprepared gauze a the wholesale price of $1\frac{1}{2}d$, per yard.) The materials used for charging the gauze are —1 part of crystallised carbolic acid, 5 parts of common resin, and 7 parts of solid paraffin; the last ingredient being used for the purpose of preventing undue adhesiveness. Paraffin has this advantage compared with any other substance of similar consistence with which I am acquainted, that it does not blend at all with carbolic acid in the cold, and therefore simply dilutes the mixture of acid and resin, without interfering in the least with the tenacity with which the resin holds the acid. If, for example, we compare it with a substance like spermaceti, we find that a mixture of 1 part of the acid with 5 parts of resin and 5 parts of spermaceti is really much more pungent to the tongue than the 5 parts of resin and one of acid alone. For although the former mixture contains only half the quantity of the acid, yet the spermaceti, blending with the acid like the

resin but holding it less firmly, takes the acid from the mixture and gives it up to surrounding objects. Such a mixture of resin, spermaceti, and carbolic acid, therefore, though admirable in consistence, would be both less mild and less permanent in action than the resin and acid alone. The addition of paraffin, on the other hand, has no other effect on the mixture than to render it somewhat more mild. It seems needful to point out this circumstance, because, from want of knowledge of it, modifications of the gauze have been suggested in which the paraffin has been replaced by other materials, which cannot fail to be disadvantageous.

In order to charge the gauze, the paraffin and resin are first melted together in a water bath, after which the acid is added and blended by stirring. The object now is to diffuse this melted mixture equably through the cotton cloth, and for this purpose two things are requisite—viz., that the cotton be at a higher temperature than the melting point of the mixture, and that it be subjected to moderate pressure after receiving it. The cotton cloth, a yard wide, is cut into six-yard lengths, and these, having been folded so as to be half a yard square, are placed in a dry hot chamber formed of two tin boxes placed one within the other, with an interval to receive water, which is kept boiling by fire or gas beneath, the upper edges of the boxes being connected and provided with an exit pipe for the steam. There is also a glass tube arranged as a gauge of the amount of the water, and the chamber has a properly fitting lid. The bottom of the chamber is strengthened with an iron plate, to enable it to bear the weight used for compressing the gauze when charged. This is a piece of wood, about two inches thick, nearly fitting the chamber, covered with sheet lead, so as to make it about as heavy as a man can lift by means of two handles in the upper surface. The weight is heated along with the cotton, and is put first into the chamber so as to leave the cotton loose for the penetration of the heat, which occupies two or three hours. The cotton, when heated, is taken out of the chamber along with the weight, and placed in a wooden box, to protect it from the cold. (It would be better to have a second hot chamber for this purpose, since in cold weather the cotton is apt to be too much cooled in spite of the protection of the wooden box.) The heated gauze is then at once charged with the melted mixture of carbolic acid, resin, and paraffin, in quantity equal to the weight of the cotton fabric (or slightly less), and, in order to diffuse the liquid as equably as possible, it is sprinkled over the gauze by means of a syringe with a number of minute perforations in its extremity, the body of the syringe and the piston-rod having each a wooden handle to protect the hands of the workman from the heat.

The syringe is constructed to hold half the quantity of the mixture required for charging one piece of cloth. One folded piece being placed at the bottom of the hot chamber, its upper half is raised and turned aside, and one syringeful is sprinkled over the lower half. The upper half is then put back into position and another syringful thrown on. The same process is repeated with all the other pieces of gauze, after which the weight is put into the chamber to compress the charged cotton, and the lid applied. An hour or two are then allowed to elapse to permit the complete diffusion of the liquid, when the material is fit for use.

The apparatus above described can be constructed by a common tinman for about £10; and it is estimated that the entire cost of the gauze to the Edinburgh Infirmary, including the price of materials and manufacture, is somewhat less than 2*d.* per square yard. For hospital purposes this expense is further reduced by the fact that the gauze, after being used for dressing a case, can be entirely cleansed of the substances with which it was charged by washing in boiling water, care being taken to press it well in the hot water with a suitable wooden implement. The cotton cloth is then even better adapted for the purpose than it originally was, having lost the slight rigidity caused by the starch or gum used to stiffen the threads before weaving. Thus the same piece of cotton may be used over and over again, with saving to the institution of the chief cost of the material, which, as before said, is that of the cotton. Practically, however, it is only larger dressings which will repay the trouble of washing and arranging in proper masses for recharging.

Solution of carbolic acid in the fixed oils, which, as regards the tenacity with which they hold the acid, occupy an intermediate place between the watery solutions and the resinous mixture in the gauze, has been for the most part superseded by these latter; a watery solution being more efficient as well as more cleanly for a detergent lotion, while the resinous mixture is more mild and more persistent, and therefore better adapted for a permanent dressing. There are, some circumstances in which the oily solutions are valuable. For lubricating instruments introduced into the bladder, such as catheters, bougies, sounds, or lithotrites, I have for some time past used a solution of one part of carbolic acid in twenty parts of olive oil—a proportion which, while unirritating to the urethra, is trustworthy as an antiseptic; and there can be no doubt that the avoidance of putrefactive fermentation within the bladder is in many cases a matter of vital importance. In using a catheter, the interior of which cannot be kept clean, but must have more or less of foreign material

encrusted upon it, some of which might by chance enter the bladder from the regurgitation, the instrument should either be kept for several minutes with the carbolic oil within it before it is passed, or, what is more efficient and saves time, it may be washed out with the 1 to 20 watery solution before being smeared with the oil. Washing urethral instruments with such a lotion will probably have the further important advantage of securing us against the conveyance of specific virus from one patient to another by their means. For a protracted experimental investigation into the subject of putrefaction and other fermentative changes having proved to me the perfect efficiency of the 1 to 20 watery solution of carbolic acid in destroying minute organisms of a fungoid or bacteric nature, I feel that we can hardly be wrong in assuming its destructive effect upon the viruses alluded to, which, though not proved to be organisms, analogy leads us to regard as in all probability of such a nature. If this be so, the use of such a lotion and lubricating oil for specula and other articles used in female complaints will prevent in the other sex the lamentable results which have now and then occurred from instrumental infection.

Cases from time to time arise in which it is desirable to have an antiseptic in constant active operation on the interior of a wound, necessitating the frequent renewal of the dressing; and for this purpose a solution of carbolic acid in about ten parts of olive oil answers well. As an example of its use in this way, I may mention a practice which I have adopted of late years in caries limited to the middle or anterior part of the tarsus and accompanied by sinuses. Cutting right across the soft parts of the dorsum of the foot, including the tendons, vessels, and nerve, I open the tarsus completely from side to side at the diseased part, when, the foot being bent upon the sole as upon a hinge, the carious portions are exposed with perfect freedom for inspection and operation, and all bones or portions of bones that appear suspicious are removed, the procedure being rendered much more precise and satisfactory by the bloodless method of operating which I have for many years pursued—viz., emptying the limb of blood by raising the foot to the utmost for a few minutes and then applying a tourniquet as rapidly as possible and so tightly as to prevent any circulation in it. The vessels having been secured, it remains to dress the wound. If this were done in such a way as to permit unchecked putrefaction in it, there would be great risk of serious disturbance from the extension of putrefactive suppuration into the tarsal joints opened in the operation. On the other hand, as the sinuses communicating with the wound already contain putrescent materials, it would be useless to

operate under the spray and apply an external gauze dressing. What is needed is something that shall prevent the putrefaction from spreading from the points where it may exist to the rest of the wound. This object is attained by first washing the cut surface with the solution of chloride of zinc, 40 grs. to 1 oz. of water—a practice of the utmost value in all cases where, in consequence of the presence of sinuses or the situation of the part, as the mouth or perineum, it is impossible to exclude causes of putrefaction from the wound. When sinuses are present, I formerly advised their injection with solution of the chloride by means of a syringe before the commencement of the operation. But though this is undoubtedly the most efficient mode of introducing the liquid into the recesses of the sinuses, I have found that the force with which the solution is driven in by the syringe may cause it to burst through the pyogenic membrane of the sinuses and become effused into the cellular tissue. This accident, in two instances (one of caries of the wrist and one of amputation through the condyles of the femur) led to extensive loss of vitality of the integument, and hence for the last three years I have contented myself with injecting the sinuses at the conclusion of the operation, when, the sinuses being freely open at the wound, the risk referred to no longer exists.

Chloride of zinc, I may remind the reader, has this remarkable peculiarity among all antiseptics that I have tried, that a single application of it to a recent wound in a solution of the strength above mentioned, though it produces no visible slough, yet prevents the occurrence of putrefaction in the cut surface for days together, in spite of the access of septic material; and if the discharges have opportunity to flow freely away, as after the removal of a tumour of one of the jaws or a portion of the tongue, there may be absolutely no odour from first to last, the divided textures being thus guarded from the bad effects of putrefaction during the dangerous period before they have been covered by the protecting layer of granulations.

But in the wound of the foot which we are considering, if any permanent dressings were employed, the blood and serum effused in the early periods of the case, and accumulating more or less in the interior, would not be prevented from putrefying by the chloride on the cut surface. And it is only in rare cases that the injection of the sinuses with the chloride has the effect of eradicating all putrefaction from them. This is a thing to be aimed at, but hardly expected. In order, therefore, to avoid the extension of putrefaction from any septic point in the wound, the antiseptic dressing must be frequently changed; and this is conveniently done with pieces of lint dipped in the oily solution of carbolic acid (1 to 10), the oil preventing

the lint from sticking in the wound, so that it can be readily removed. In order to admit of the free application of this dressing to all parts of the cut surface, the wound is made to gape freely by depressing the toes along with the footpiece of the M'Intyre splint on which the limb rests. The oiled lint is renewed every three hours day and night during the first twenty-four hours, and after this the interval is gradually increased as discharge diminishes, till after three or four days one dressing per diem is sufficient. The free exposure of the wound has this further important advantage, that it permits the surgeon to examine the surface with the finger from time to time in order to ascertain when the bones are entirely covered with soft granulations; for then and not till then can he be sure that the bones are perfectly sound, and as soon as this is the case the footpiece is adjusted at right angles with the leg, so as to permit the granulating surfaces to coalesce and the wound to heal. In all the five cases in which I have hitherto had occasion to employ this treatment, the immediate object was completely attained, the foot remaining quite free from inflammation, and the constitution without febrile disturbance. Two of the cases are still under treatment, not yet completely cicatrised. Of the other three feet operated on in this way, two are useful and strong, though more or less shortened. The other, after being a perfectly serviceable foot for several months, became the subject of relapse, requiring amputation at the ankle. The practice was suggested to me by the remarkably satisfactory results of antiseptic treatment in a case of wound by a circular saw which divided the soft parts completely at the instep, laying the ankle-joint freely open. The patient not only recovered with a freely movable ankle-joint, but, except a line of cicatrix across the instep, there was nothing abnormal in either the appearance or actions of the foot. And it is somewhat remarkable that, in the cases of disease, where the wound has been left gaping for weeks, not only has the power of extension of the toes been restored, but sensation has been recovered in the parts supplied by the divided nerve.

As another example of the usefulness of the oiled lint may be mentioned abscess beside the rectum, where the vicinity of the anus renders a permanent gauze dressing inapplicable. The skin having been washed with 1 to 20 watery solution of carbolic acid, the abscess is opened under the spray where it points, and a pad of lint soaked with 1 to 10 carbolic oil is applied and retained by a T bandage, and changed every five or six hours. Before defecation, the patient draws the bandage and pad towards the side where the wound is, so as to keep the latter covered while exposing the anal outlet, which is carefully

cleansed with a piece of lint dipped in the antiseptic oil before the pad is readjusted. The oil, penetrating among the folds of the skin, is more efficient for this situation than the gauze would be, even were it frequently changed. After two or three days have passed, the strength of the oil may be reduced to 1 to 20, if the stronger proportion causes irritation. I have treated several cases in this way both in hospital and in private practice, and, in every instance the occurrence of fistula has been avoided, although in some of them it was ascertained, by digital examination of the rectum before opening the abscess, that pus was present in the submucous tissue—a state of things which, I believe, inevitably leads to fistula if the abscess is treated in the ordinary way. Of course scrupulous care on the part of the patient is essential to success, but this I have not found wanting, even in hospital cases, when it is clearly explained that fistula will be prevented by the requisite pains.

It is an interesting fact, pathologically, that the progress has been equally satisfactory when the pus has been fetid on evacuation as when it was odourless, the discharge being a mere serous oozing after the escape of the original contents. This seems to imply that the cause of the fetor was not any organic (bacteric) ferment, but a peculiarity in the action of the part. For had septic organisms been present before the abscess was opened, they would have continued to propagate in it in spite of the antiseptic treatment; and the result would have been the same as under poultice or water dressing, or, what comes to the same thing, under an antiseptic dressing, carelessly employed. For it is hardly needful to point out that neither the spray nor the carbolic oil applied externally, nor the oiled lint inserted in the outlet to serve as a drain, could correct putrefactive fermentation once established in the abscess cavity. Here, as in the antiseptic treatment generally, the means used are calculated to prevent, not to correct putrefaction.—*Lancet, March* 13 *and* 20, 1875, *pp.* 365, 401.

41.—ON THE USE OF DRAINAGE-TUBES IN THE TREATMENT OF ABSCESSES.

By Joseph Lister, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

In the case of abscess beside the rectum a bit of lint soaked with carbolic oil is used for a drain, simply because in this situation it is not easy to keep in position a caoutchouc drainage-tube, which, under ordinary circumstances, is greatly to be preferred, since it does not at all obstruct the flow of discharge, and may be carried to any depth that is desired, and can be removed and reintroduced without difficulty. Hence a drain-

age-tube of comparatively small size introduced through a mere puncture in the skin, or through a small interval between stitches, is more efficient than a free incision or a widely gaping wound without the use of a tube. The tubes should vary in size in proportion to the quantity of discharge anticipated, from the thickness of a crow-quill to that of the little finger, and the holes in them should have a diameter about half that of the tube. The outer end of the tube should be on a level with the skin, and it is conveniently maintained in this position by means of two pieces of silk passed with a needle through two opposite points of the edge of the tube, the ends of each thread being knotted at a distance of one or two inches from the tube. These knotted threads being placed straight upon the skin, one at each side, the knots exert friction upon the dressing bound down upon them, and prevent the tube from being pushed in, while the dressing itself keeps it from protruding, so that the orifice lies flush with the integument. When the tube has to be placed obliquely, its outer end must be cut obliquely in proportion, otherwise it is apt to become partially buried and blocked up.

Another cause may lead to partial obstruction in chronic cases, such as spinal abscess—viz., the projection of fungoid masses of granulations through the holes in the tube so as to interfere with its calibre, and at the same time cause difficulty in extracting and reintroducing it. But this inconvenience is got over by having the holes restricted to the vicinity of the deeper end of the tube: for it seems to be chiefly at and near the integument that the granulations have this tendency to fungate; and in cases of this kind it is only at the deeper part of the tube that holes are required.

In recent wounds I used to think it needful to take out the tubes on the day after operation or accident to clear them of clotted blood. But I find this is wholly unnecessary, the shrinking of the clot apparently preventing it from interfering with the exit of discharge, so that a tube introduced at the time of an operation may be left in for three or four days, by which time the tissues around it will have been consolidated by organising blood or lymph into a smooth channel, into which the tube can be readily re-inserted, which is by no means always the case if it is taken out the day after operation.

In large and deep wounds, where very free drainage is required, it is convenient instead of using one tube of very large calibre, to insert several of smaller size side by side. These, while quite as efficient as a single large one, do not separate the edges of the wound so much, and they can be afterwards withdrawn one after another as the discharge becomes reduced.

It is impossible to exaggerate the importance of drainage-tubes. In abscesses they must be employed till the cavity is completely closed; and in wounds not only are they invaluable during the first twenty-four hours, when the irritation caused by the action of the antiseptic on the tissues during an operation renders the flow of bloody serum more free than it would be without antiseptic management; but when the wound is of any considerable depth they should be used so long as even trifling serous oozing continues. For if the outlet proves insufficient for the free escape of the plasma still effused into the interior, the fluid, accumulating in the cavity, gives rise to tension, and hence to inflammatory disturbance, which may lead to suppuration and more or less opening up of the wound. —*Lancet, March* 27, 1875, *p.* 434.

ORGANS OF CIRCULATION.

42.—WOUND OF THE INTERNAL CIRCUMFLEX ARTERY IMMEDIATELY AFTER ITS ORIGIN FROM THE PROFUNDA FEMORIS; PROFUSE BLEEDING, TREATED SUCCESSFULLY BY PRESSURE AT THE WOUND, CONJOINTLY WITH COMPRESSION OF THE FEMORAL ARTERY.

By Richard J. Butcher, Esq., M.R.I.A., M.D., Surgeon to Sir Patrick Dun's Hospital, Dublin.

Richard B., aged twenty-four years, a tall, well-developed man, was admitted to Sir Patrick Dun's Hospital, August 18th, 1872, at one o'clock a.m. He had been in a struggle, and was struck with a knife, and bled freely before admission. On being stripped, there was discovered a wound, with clean cut edges an inch in length, in the right groin, slightly inclined to the femoral artery, and about two inches below Poupart's ligament, and at right angles to the axis of the limb, the external edge of the wound being not an eighth of an inch from the internal wall of the vessel. The man's trousers, boots, and stockings were saturated with blood, and on his admission (about ten minutes after the accident) blood was continuing to flow, and appeared to well-up from the bottom of the wound, and was of a bright colour. The man was immediately placed in a bed in the horizontal position, and the hemorrhage was arrested almost immediately in his weakened state by pressure being applied over the wound by compress and bandage. His clothes being removed, the entire limb was bandaged from the toes up to the groin, and steadily over the wound, by a few additional turns and also additional pads. The leg was then raised to a considerable height on a plane of pillows. A large

draught of opium was given. After a few moments he slept quietly. Towards morning he complained of acute pain in the groin. A large opiate was administered, which lulled the suffering. At 10 a.m., August 19th, as the dressings were bloody from a fresh flow, I removed all of them, and drew the edges of the wound steadily and gently together with adhesive straps, reapplied the pressure by compressors over the wound, and steadily bandaging from the toes up. Pulse bounding and very unsteady. Great restlessness. Ordered a full opiate, to be repeated every fourth hour. Limb considerably elevated on pillows. Pulse, 128; temperature, 99; perspiring freely.

September 3rd. Woke up at 6 a.m., to stop hemorrhage from the wound; the patient was awake when it occurred, and he stopped it with the pressure of a padded key, which was left beside him for the purpose until aid was procured. The amount of blood lost was about six ounces, suddenly, of a bright scarlet colour. The leg and thigh were re-bandaged; a four pound weight was placed over compressors resting on the wound and above it, limiting the supply not only to the wound, but prohibiting its course immediately above it. At this time the hemorrhagic tendency was up; the digitalis mixture was again had recourse to, and ice to allay the patient's thirst. I visited the patient again in the evening, and as there was some discoloration of the dressings by blood, I removed everything. The surface of the wound seemed anything but healthy. I washed its surface over with a 20 gr. solution of nitrate of silver. I rolled the limb carefully from the toes upwards to above the wound, having dressed it with mild ointment, and applied suitable compresses upon it sufficient to control any bleeding from the lower end of the vessel. I next brought direct pressure to bear on the femoral artery just as it passed off the pubis by the compressor, which I have used successfully in aneurism before now. The current was very nearly altogether obstructed in the main trunk, and so the weight of the column of blood was removed from the wound, and the upper end controlled. The limb was supported on pillows, and elevated as before. I depended then for the supply of blood to the limb from the numerous anastomoses which surround the hip on all sides. The constitutional treatment continued as before.

[There was no return of the bleeding, but recovery did not go on without further drawbacks.]

There are two great surgical problems worked out in the history of this case. First, the management of the large wounded artery deep in the thigh, just within the line of the femoral vessel, refusing to be healed up by the general pressure

applied to the limb, and directly to the wound, favoured by position; yet by the addition of compression on the main trunk, above the wound, all further flow was prevented, the artery became sealed up, and the wound healed.

Every practical surgeon knows the difficulties to be encountered in attempting to secure the cut ends of a divided artery in a deep, narrow wound, the very dilatation of the wound endangering other vessels, and increasing difficulties, more particularly when the injury lies close to a large trunk, and in the vicinity of where numerous vessels pass from it, and where important nerves are situated. No surgeon will hesitate about the propriety of tying both ends of a divided artery when it can be readily got at, and when the anatomical relations to it can be defined; but when a knife has been thrust deep into a limb in the proximity of large vessels, and when blood wells up rapidly, showing that some considerable-sized artery has been cut, I would warn the surgeon to pause before he dilates the wound, and would suggest a trial of the treatment which I have advocated in the foregoing pages. In my work on "Operative Surgery" I have given many instances where wounded arteries were cut down upon under great difficulties, and tied successfully, yet in cases such as I have now described I think the line of treatment applied to it the most scientific, and likely to ensure success. I would strongly recommend the same mode of practice in cases of secondary hemorrhage after amputation—I have several times employed it, and with the happiest results. The following case affords a good illustration of its efficacy and benefit:—On the 12th November I amputated the thigh. The case was a very urgent one, and I wanted not to lose a tablespoonful of blood. I performed in this instance the circular method. The patient was under chloroform; I swept the knife rapidly round and turned up the skin; I cut through the muscles partly obliquely, and divided all round the periosteum; all retracted, the bone was sawn; the main artery was carefully ligatured, and the minor vessels quickly tied, so great was the vascularity from long continuance of disease of the knee-joint; a ligature was placed around the leg, just before the incisions, so as to prevent any regurgitant flow from below; the wound was rapidly dressed, and the patient woke quietly from her sleep under chloroform, and was not aware that the operation had been performed. Some time after startings of the limb of the most terrific character set in, which were only quieted by very large and repeated doses of opium; it is reported that on the 13th, the 14th, and 15th, nothing could be more violent than the jerking of the stump, though fastened upon a pillow; yet it, too, was lifted up almost vertically. At this time the patient

was taking, and had been taking, sixty drops of Battley's sedative every third hour, day and night. On the 16th I dressed the wound, the patient being placed under the influence of chloroform by Dr. Bennett. Report given on to-day.—The wound looks very healthy; no tension; a large portion is united; spasms so violent that I injected into the thigh, near the groin, some of the following preparation of morphia;—℞ Aquæ distill., 3 j.; acid acet., gutt. v.; acetatis morph., gr. 5. M. With a very fine syringe I injected under the skin eight minims of this fluid, according to the minim scale marked upon it. As I have observed frequently in other cases after its injection, so likewise in this instance, a little nausea followed, which was evidenced in seven minutes; the acute pain was subdued, and the spasms moderated. This treatment had frequently to be resorted to, as well as the internal administration of large doses of Battley and abundant stimulants, with most nutritious broths, &c., until the 20th, when there was rapid secondary arterial hemorrhage, which most fortunately occurred when I was in the room. While talking to the patient she suddenly exclaimed, "There is something warm and wet about my limb." On throwing down the clothes a large quantity of fluid arterial blood was visible. I at once compressed the femoral artery at the groin, and arrested its flow, and having procured assistance, elevated the stump, and fastened a nine pound weight over the artery, taking the place of my fingers. The weight was tightly bound down with considerable force by a bandage passed round the thigh and loins in a figure of 8 form. All the constitutional evidences of an hemorrhagic tendency were present—a bounding rapid pulse, great anxiety and restlessness, flushed face, brilliant eyes, severe pain in the stump, with violent spasms and rapid jerkings. In addition to the weight over the femoral artery, I at once screwed down gently the tourniquet, to support its effect. The stump was raised upon a pillow, almost vertically, and its surface covered with ice; large doses of opium administered. By this means the bleeding was controlled, and soon the patient began to doze. I remained with the patient for several hours, until all danger of recurrence had passed away; ordered full opiates every third hour. Nov. 21st, 7 a.m.—A very good report; no return of bleeding; pulse good, and had taken freely of nutriment and wine, as directed, and several draughts of opium. At 12 again visited.—Doing well; sleeping quietly. At 1 o'clock I was sent for, as there was some slight bleeding. On my arrival found the patient excited, tossing about, and, in fact, very restless, with the hemorrhagic tendency strongly marked, and some arterial weeping from the wound, though additional pressure had been put on at the groin. I endeavoured

by more suitably applied pressure to control the vessel at the groin, and did so as long as it was kept up, but this could not be relied on except temporarily, so that at 5 o'clock p.m. removed everything from the surface of the wound, elevated the stump at right angles with the trunk, applied the arterial (aneurism) compressor at the groin steadily upon the vessel, and then supported the stump with pads and wide straps of adhesive plaster, thus making gentle pressure all over its surface, and then sustained the entire in this elevated position by several small pads, and a pillow beneath it; a bladder containing ice was then allowed to rest upon the face of the stump, its chief weight being borne by the pillow, above and beyond its surface, and a full opiate and forty drops of Battley to be continued every fourth hour.

April 22nd. Had a quiet night, and slept a good deal; took a pint and a half of strong chicken jelly and beef-tea, five glasses of wine, and brandy at intervals.

On the 23rd. No throbbing or hemorrhagic tendency; has taken nearly two quarts of beef-tea and chicken jelly, four glasses of sherry and four of claret, besides brandy; stump cool; pressure of aneurismal clamp most effectual, never moved; no distress or complaint about its pressure, therefore no meddling with it; to continue the Battley, fifty drops every fourth hour, which repeated doses are all essential towards controlling the spasms, which seem ever vigilant to come on.

This morning visited the patient at half-past seven, being restless during the early part of the night, and having had altogether only two hours' sleep, owing, as she says, to the pressure of the compressor. Re-adjusted the compressor higher up, and dressed the wound, which looks very healthy; cut out all the stitches, and though the stump has been sustained in the erect position for such a length of time, the flaps are well united in front, with plenty of material, not the slightest drooping backwards, owing to the manner in which the bandage acted, steadying the parts forward, and assisted by the pillows supporting them from behind and below up to the front of the stump; then, when all the dressings were complete, placed the pad of the compressor on the artery, over the pubis, with moderate force sufficient to control its current, the ball and pad being directed slightly upwards; the skin over the vessel which had been first pressed upon was quite red and blistered; the use of the ice was now stopped; to continue nutriment, stimulants, and opiates as freely and as frequently as before; no less under the many distressing influences would sustain life.

On the 28th the condition of the parts was most satisfactory. All dressings being removed, several ligatures came away; the

one on the main artery and some others remained unmoved. There was very little discharge, and the deep parts of the wound well consolidated. The parts being well sustained from behind forwards, both by pads and plaster, a bandage was applied from above downwards, so as to prevent retraction or dragging on the recently healed edges. The stump was then fixed on pillows at the same high angle, and steadied by a few turns of a bandage pinned to the bed on either side. I then made an assistant make pressure on the artery above the aneurism compressor at the pubis, and, after resting a few moments, I took all pressure off the artery. The artery seemed to be occluded at the site of the pressure, for no pulsation could be felt. The assistant kept digital compression over the trunk at the pubis for fully ten minutes; on its being removed the patient felt no heave or impulse at the part, indeed, she distinctly stated that "the throbbing at the instrument ceased two days before." From the condition of the parts and the patient's feelings, Dr. Bennett and myself considered that the femoral artery was occluded; there was not the slightest tinge of blood during the dressing. From this period up to the healing of the wound and the patient's perfect recovery, there was no return of bleeding.

In the case just related the patient was so shockingly reduced from long continued illness before this operation, and the loss of blood which she sustained by the secondary gush, that the least additional flow, produced by any effort to secure the vessel in the stump, or by cutting operation higher up, would, I am perfectly convinced, have caused her death. The patient's life was saved by the conservative measure—*the immediate application of pressure on the main trunk*, so that not a drop of blood was lost after—conjointly with the enormous amount of stimulants, nutriment, and sedatives so abundantly supplied throughout the after progress of the case.

The second important problem established in Bell's case is the propriety of immediately opening all formations of matter occurring after primary injury, whether located within or without the joints. The following case is interesting, as corroborative of the practice. A tradesman, aged 46, applied to me in October last, having received a deep punctured wound in the palm of the hand from a bradawl. He paid but little attention to it for a time. However, at the end of ten days the palm became exceedingly painful, hard and tense, while the dorsum of the hand was enormously swollen, and of a livid red colour; fever of the inflammatory character of the very highest type ushered in these symptoms. Together with this most serious condition of the hand, the lower end of the forearm was swollen and very tense, evidently showing that the mischief had

extended so far also. I carefully incised the palmar fascia in two positions, having made a small wound over the metacarpo-phalangeal articulation of the index finger through the integuments and superficial bands of fascia. I passed up a director, slightly bent its concavity forwards, and divided fully the fascia so high as the muscles of the thumb; and, in a like manner, introduced the director through a wound similarly situated over the base of the ring finger, carrying the incision nearly up to the annular ligament. A large quantity of matter escaped by both wounds, and very little blood from the manner in which the director lifted forwards the fascia to the security of the palmar arches behind; so tense were the parts that the wound gaped considerably. In spite of these free incisions, the perfect relief of tension, the unloading of vessels, and the discharge of pus, still, from the broken down constitution and habits of the man, the inflammation progressed up the limb, assuming the "diffuse" character. Two incisions were made parallel to and very near the brachial artery, one above the elbow-joint, and the second near the axilla, from both of which imperfect pus escaped. During all this time the patient was most liberally supplied with stimulants, nutritious broths, and eggs, &c., repeated large doses of opium, somewhat after the same manner as followed out in Bell's case. After the inflammation seemed checked in its upward course at the axilla, the elbow-joint of the affected limb was attacked, occasioning the most excruciating pain, over which was applied a thick paste of watery extract of opium and belladonna; this covered over with warm stupe cloths, alleviated to a certain extent the intense suffering. In four-and-twenty hours after the inflammation and pain set in, it was quite clear that matter was poured out into the joint; there was considerable prominence, tension, and deep fluctuation over the front and inside of the joint; rigors were incessant, and the patient was bathed in sweat. I laid open the joint freely on its inner side, taking the internal border of the olecranon process as a direct guide to the part; pus was let out to at least a wine-glassful; there was very little weeping of blood after the first discharge, and the edges of the wound flew wide apart, so completely was the tension relieved; a full stimulant and opiate were administered, and, after an hour's time, the patient fell into a quiet sleep, from which he awoke free from pain. It is not necessary to pursue the case further, as, after this period, there was a total arrest of the inflammation of the soft parts by the free incisions which had been made, as well as a healing process set up in the joint after the matter was evacuated. Though the motions of the fingers and hand, as well as the elbow-joint, were stiffened and crippled for some time, yet the man eventually and at the

present time enjoys excellent motion and power over each. Such a fortunate result must be ascribed to the mode in which the incisions were conducted, free and extensive as they were, and to the full administration of stimulants and nutriment, with the repeated doses of opium.—*Dublin Journal of Medical Science, Nov.* 1874, *p.* 369.

43.—ON THE TREATMENT OF POPLITEAL ANEURISM.

By Timothy Holmes, Esq., M.A., Professor of Surgery and Pathology to the Royal College of Surgeons.

The first step in the treatment of popliteal aneurism is to ascertain as accurately as may be these particulars with regard to the case in hand, and to base upon them the important choice of the method to be first adopted. The choice between the ligature and some form of pressure (including genuflexion amongst the latter) will rest chiefly upon the presence or absence of a thick well-formed sac, lined with some amount of coagulum, on the judgment of the surgeon as to the relations between the sac and its orifice, on the acute or chronic nature of the symptoms, and on the presence or absence of disease of the heart, arteries, and kidneys. Those are the most promising cases for the success of the compression treatment in which the symptoms are not urgent or rapidly advancing, in which there is a strong sac and a certain amount of fibrine already deposited, and where the character of the bruit and of the pulsation points to the conclusion that the aneurism is not fusiform. And in cases where the presence of other general complications renders the surgeon anxious to avoid the risks attending a serious operation, we know that compression has very often succeeded, although we also can point to many cases of successful ligature of the femoral artery in patients suffering from cardiac or renal affections, or with aneurism in other parts.

The question what form of pressure to select is one which I must leave till I have discussed the various methods.

Then comes the question, if compression does not succeed at first, how long should it be persevered with? This question can of course only be put or answered in very general terms. It resolves itself, as far as I see, into this. Have we evidence so conclusive of the greater freedom from danger attending on compression, as compared with the ligature of the femoral artery, as to make us anxious to persevere at all hazards in the attempt to cure popliteal aneurism in this way, even in cases where pressure causes much suffering and seems at first to produce little effect? My own opinion is that we

have not. I am quite ready to admit that in many instances the determined persistence in compression has been rewarded by ultimate success, after weeks or months of tedious endurance, and sometimes even of acute suffering. Perhaps too little attention has been paid by surgeons generally to the great distress which such prolonged compression causes—the ulceration, the enlargement of glands, the pain, the engorgement of the limb, and the mental distress and disappointment. But, nevertheless, if it could be clearly shown that all this is necessary in order to diminish the mortality, it would clearly be our duty to induce our patients, if possible, to submit. I cannot say that this has at present been shown, nor can I show it by any evidence I have been able to collect. All the facts in my possession tell the other way. Pressure does sometimes succeed after prolonged perseverance, but usually, I believe, it fails ultimately when during the first few days it has not, at least so far, succeeded as to ameliorate the patient's condition, to diminish the size of the tumour and the strength of its pulsations, and produce some enlargement of the collateral vessels.

This risk of ultimate failure would, again, be of the less moment if the doctrine which is now generally taught, and which has been adopted into our text-books, from Mr. Jonathan Hutchinson's researches, were true—namely, that when compression fails, it does not usually fail utterly, but that its failure is balanced by the diminished risk which, under those circumstances, attends the ligature of the femoral artery. But I much fear that this doctrine is not true. Mr. Hutchinson's numbers were very small, and were not in themselves very convincing. The larger experience contained in my table of hospital cases leads to precisely the opposite conclusion, and it is that which seems more consistent with *à priori* probability. I am reluctant to abandon an opinion which I have taught, and, as I then thought, on sufficient authority; but I must admit that the evidence up to the present time leads to the conclusion that a patient is not more but less likely to recover from ligature of the femoral if a prolonged application of pressure has previously been made.

And if to all this we can add, as I hope we can, that the Hunterian ligature is much less dangerous than we have been taught to consider it, the motive for avoiding the alternative of tying the artery, even at the cost of much suffering to the patient, would be taken away. And I think I can show very good reasons for believing that the estimate of the danger of ligature of the femoral artery, based as it is in a great measure on the results of practice in former generations, handed down to us by Norris and other statistical writers, is much more

unfavourable than present hospital experience justifies. So that the general conclusion would be that it is better, after a careful but very moderate trial of the compression treatment, to abandon it, if it does not seem to be doing good, and to resort to the ligature before the patient's chance of recovery from that operation has been permanently impaired. How long a time is involved in the expression "a very moderate trial" it may be rash to try to specify. There must be much variation in individual cases; but my own impression is that more harm than good generally results from protracting the attempt beyond a week. I would, however, stipulate that the trial should be really careful—that is to say, that precaution should be taken to see that, whatever form of pressure is adopted, it is constantly applied with accuracy, and is really producing the effect intended during the whole period of its application. And I would urge upon country surgeons, and others who are not in a position either to superintend the compression treatment themselves or to leave it in the hands of perfectly careful and competent assistants, to reflect whether it would not be safer for the patient either to tie the artery at once, or to send him to some institution where the more troublesome mode of treatment can be efficiently carried out.

We shall do well, to commence the discussion as to the relative merits of compression and the other bloodless methods of treating popliteal aneurism by the very distinct assertion that we have in the Hunterian operation a method which almost always succeeds, if the patient recovers from the operation; and which may be expected confidently to be followed by recovery in the very large majority of cases, especially if the dissection be skilfully and carefully conducted, so as to avoid all violence to the vein and all unnecessary exposure or contusion of the artery.

As far as they are to be learnt from our table, the results of the compression-treatment of popliteal aneurisms may be thus expressed:—Compression was tried in 66 cases with success, and in 58 cases without success. Of these latter, the artery was afterwards tied in 44; amputation was practised in 8. Death occurred in one case. In 4 cases there is no evidence of any subsequent treatment, though in one of them, which occurred at St. George's Hospital, it is believed that the femoral artery was afterwards tied with success at St. Bartholomew's. Finally, one case is left in which the aneurism had recurred after apparently successful ligature. Pressure in all its forms was now tried and failed; but manipulation seemed to produce consolidation, at any rate for the time.

The most interesting questions in this record of experience are those which refer to the frequency of the failure of com-

pression; to the effect which compression may have, if it fails, on the future progress of the case; and to the form of pressure which it is best to employ. I will address myself to these matters in their order.

First, as to the frequency of failure. It seems certainly at first sight a discouraging fact that pressure should have failed 58 out of 124 times—that is about as often as it succeeded. But I am not prepared to admit that this result furnishes any valid argument against the treatment. We must remember that these cases go back a long way in the history of compression, and many of them were under the care of surgeons who were by no means favourable to the use of pressure, and had no experience of the way of carrying it out. One of them, for instance, was under Mr. Syme's care, who felt certainly little interest and less confidence in this novel method of treatment. Then, again, it is quite permissible, I hope, to say that in hospital practice many little details which in private receive the attention of the surgeon himself, are confided to students and dressers, or to nurses, who cannot, even when they give all possible care to the case, manage such details as well as the surgeon himself would do, and who are not always as careful as they might be in carrying out a treatment undeniably tedious and wearisome. I have often found the tourniquet tightly screwed down into the thigh, but the artery not compressed at all. I have often seen it applied with such injudicious and unnecessary force as to cause the failure of a treatment which might easily have been successful if more skilfully used. I have known a case in which the patient used to relieve herself from the instrument, and walk about the hospital, with the connivance of the nurse, on changing whom the treatment was at once successfully completed. The compression treatment depends for its success on minute attention to all the little details of the case, and can only be properly carried out by persons both skilful and scientifically interested in the matter. It requires far more care and time on the surgeon's part than the ligature, and if confided to others will very often go wrong. But, besides all this, we must not forget that the great majority of these cases were treated by instrumental compression, and I think it is beyond all question that digital pressure is in every way superior.

Yet, if we allowed that failure must continue to occur in half the cases so treated, ought this to discourage us or to forbid the trial of pressure? Plainly not, however successful the ligature may be, unless there is some great reason for believing that it will spoil the prospects of the successful treatment of the case afterwards. For the application of pressure in favourable cases certainly exposes the patient to no risks,

while the ligature of the femoral artery, however favourably the operation may proceed, must always involve considerable danger.

And we must not forget that in a table such as this cases must necessarily be included under the head of "compression" where that treatment has been most imperfectly carried out, and which were possibly altogether unsuited for it. Thus in a case of very rapidly growing aneurism, at one of the provincial hospitals, the surgeon wished to try the effect of pressure with one of the then recently invented apparatus; not having it at hand, he was obliged to use a rude and ill-fitting instrument, which only did harm. The tumour grew rapidly; the femoral was tied, but gangrene followed and amputation became necessary. Such a case, if treated by pressure at all (which would be a doubtful point), should be treated by the most careful and exact digital pressure. An ill-fitting instrument, probably gorging the veins with blood and allowing the artery constantly to escape, while distressing the patient with the pain it causes, can only prejudice his chance of ultimate recovery. The only case in which death occurred while the patient was under the treatment was one in which pleurisy accidentally supervened, and, as this seems to have been unconnected with either the disease or its treatment, no more need be said about it.

But there can be no doubt that in this, as in other methods of treatment, disasters will occur. Thus there are eight cases in which amputation became necessary from gangrene, rupture or suppuration of the sac. Of these, five died, and three recovered. The amputation was not, however, in all cases necessitated by the compression; at least, not by this only, for in at least one instance a temporary ligature had been applied to the femoral, and in another the compression (instrumental) had only been applied irregularly and at long intervals, so that the gangrene of the foot which supervened probably depended on the increase of the tumour, and might very possibly have really been obviated by more persevering use of the treatment.

Still we must not lose sight of, still less conceal, the fact that in some cases instrumental compression may produce gangrene by obstructing the vein; that digital pressure, particularly when ill or carelessly applied, may do the same; that either of them, if it does not cure, may easily aggravate the disease; and, finally, that genuflexion, as I shall try to show in its proper place, has dangers of its own which lead to rupture of the sac, and sometimes to gangrene of the integuments which cover it. So that in a small proportion of cases pressure certainly has spoilt the case so completely as to render ampu-

tation necessary—an operation which, I need not say, is in such circumstances one of peculiar danger.

There are also, as it seems, cases in which pressure produces a direct effect on the artery, and some in which the tissues around the artery are much thickened and consolidated. The longest period during which compression has ever been applied to the same spot, as far as I know, was in Verdier's case, where the patient kept the apparatus applied to the external iliac artery for more than four years, sufficiently tightly to command the circulation through the aneurism. The result, as figured in Verdier's book, was only that the coats of the artery seemed a little thickened and hardened at the seat of pressure. Mr. O. Pemberton, however, has related a case in which an arterio-venous communication formed at the place where the femoral had been compressed for several months, in the treatment of an aneurism of the posterior tibial artery. I have myself experienced much difficulty, while tying the femoral artery on a patient who had been subjected to various forms of compression, in separating the artery from the vein, and many surgeons have spoken of the brawny character of the tissues through which they have had to cut when tying arteries after long-continued compression. These possible ill effects of compressing, even though we should believe them to be exceptional, as is probably the case, furnish another reason for limiting our trial of pressure to a moderate time, and for resorting to ligature before such lesions can have been originated.

I may, perhaps, conveniently speak in this place of the general question of the direct effect of pressure on the structure of the vessels on which the force acts. In the first place, all experience and all authority lead us to believe that any visible or tangible anatomical lesions are perfectly exceptional. Dr. Bellingham and Mr. Tufnell appear disposed to deny their existence, but this position can hardly now be sustained. Everyone, at any rate, is agreed that the action of long-continued compression is often plainly perceptible on the cellular tissue which supports and unites the vessels, as it was in the case to which I have just referred in my own practice, as well as in cellular tissue and muscles of the whole limb, when long-continued œdema has resulted from its use.

In Verdier's case, the contrast between the point at which the pressure has acted and the neighbouring portion of the vessel is perfectly perceptible, although the drawing is not all that could be desired.

Verneuil has recorded two cases in which he has found the vein obliterated at the point of pressure.

Mr. Pemberton's case, however (of which the preparation and diagram are before you), is the only one, as far as I know,

where any very serious vascular lesions have been attributed to the long-continued use of pressure, and in that instance it is impossible to deny that the pressure was, to say the least, a very probable cause. The arterio-venous communication exists at the exact spot where the femoral artery had been so long compressed against the pubes. It was discovered ten months after the cessation of the pressure, and that interval appears to me a very natural period for the discovery of the disease if it were formed as the result of a chronic degeneration in the wall either of the artery or the vein, the vessels having previously been matted together by the pressure. The only difficulty in accepting this view is furnished by the very analogous case of Mr. Perry, the preparation of which, from St. Bartholomew's museum, is on the table, which corresponds very curiously with Mr. Pemberton's in almost every feature, except this (which, however, is very important), that there was an aneurismal sac —a true varicose aneurism—lying between the vessels, and partially ossified, and it was evidently the pressure of this partly ossified aneurism on the vein and its rupture into that vessel which gave rise to the arterio-venous communication. In Mr. Pemberton's case there was no such tumour, and no such reason for any communication between the vessels; nor can I understand how the artery, if we assume that it was diseased and gave way spontaneously, could have opened into the vein unless the two vessels had first been brought into unnatural contiguity, for which no reason can be assigned except the pressure. I accept this case myself therefore as one of a lesion produced by long-continued pressure, and as far as a single case can go, it furnishes an argument both for avoiding too long continuance of compression, and for avoiding as much as possible the compression of the vein along with the artery.

Mr. Pemberton himself has, however, changed the view of this case which he held at first, and has suggested that the disease and the communication between the two vessels may be a result of the cure of the aneurism below, indeed, he goes so far as to say that he believes the formation of arterio-venous aneurism "to be a not uncommon result of the cure of aneurism, after it has been effected for some time." In support of this he relates a case under the late Mr. Amphlett's care, the preparation from which is now on the table, through Mr. Pemberton's kindness, where, after the ligature of the femoral artery for femoral aneurism, an arterio-venous aneurism formed three years afterwards at the seat of the ligature. This occurrence, however, does not, to my mind, in the least invalidate Mr. Pemberton's previous explanation of the arterio-venous aneurism in his own case. I believe that it originated in some

chronic degeneration either of the wall of the artery or vein, or the cellular tissue uniting them (or, as is perhaps more probable, in all these tissues), the result of long-continued pressure; and it seems to me most probable that in Amphlett's case a similar degeneration had followed upon the violence done to the parts in the operation, and the irritation caused by the ligature afterwards. That the formation of arterior-venous aneurism higher up is "a not uncommon consequence" of the cure of aneurism lower down, I have found no evidence—in fact, amongst the multitude of cured aneurisms of which we have records I do not know that the fact has ever been alluded to. In Parry's case an arterio-venous aneurism higher up formed simultaneously with an arterial aneurism lower down, but the latter had never been cured.—*Lancet, Dec.* 12 *and* 19, 1874, *pp.* 826, 861.

44.—ON TRAUMATIC POPLITEAL ARTERIO-VENOUS ANEURISM TREATED SUCCESSFULLY BY LIGATURE OF THE POPLITEAL ARTERY AND VEIN.

By Thomas Annandale, Esq., F.R.S.E., Surgeon to the Edinburgh Infirmary.

Peter R., aged ten, was admitted into my wards in the Edinburgh Royal Infirmary on the 28th of October, 1874. Three months before admission he received a wound in the popliteal space from the point of a pair of scissors. Blood poured from the wound in a large stream, but a jacket bound round the knee and wound partially checked the bleeding, and a woman supposed to possess some medical knowledge being sent for, a bandage was applied by her and the hemorrhage completely stayed. Three days after the accident the bandage was removed, and no bleeding followed, but a small swelling was observed in the region of the wound. The advice of a schoolmaster being taken at this stage of the case, poultices were applied on his recommendation, and were continued for some days, until a small piece of "dead flesh" had come away. After this tincture of myrrh was applied to the wound, which soon healed soundly. The swelling was observed to beat quite distinctly, and caused him much pain during both the day and night. His leg was often cold, and he was glad to get up at night and warm it at the fire, as heat always relieved him. After the first few days following the accident the patient was allowed to go about, and one month after the injury he went to visit a relative at some distance, and was walking for nearly a whole day. The swelling had been very slowly increasing; but one month ago, after receiving a kick over the same region

from a donkey, a more rapid increase in its size took place, and for the first time, he was seen by a medical man, who advised him to come into the infirmary.

When admitted, a swelling the size of an infant's head, and of an irregular shape, occupied the popliteal space, and passed upwards for a short distance along the posterior aspect of the thigh. The swelling was seen to pulsate, but not very forcibly; and when the hand was placed over it, the characteristic aneurismal expansion could be felt on all its aspects. No peculiar thrill could be felt in the swelling. Pulsation was absent in the anterior and posterior tibial arteries at the ankle. At one point the swelling was very prominent, and the skin over this point was thinned and discoloured.

The case being diagnosed as one of traumatic aneurism of the popliteal artery, it was decided to treat it by laying open the sac and tying the artery above and below the wound.

On the next day, the 29th of October, I proceeded to operate in the following manner. A tourniquet being applied to the femoral artery in the upper part of the thigh, I made a small incision into the centre of the sac, sufficiently large to admit my forefinger. My reason for making this limited opening in the first instance was, that I could, if necessary restrain any hemorrhage until the finger had made an examination of the sac and separated any adherent clots. I learned the value of this practice in assisting the late Mr. Syme in most of his serious operations on large aneurisms. Having searched the sac with my finger, I gradually withdrew it so as to lay the whole cavity open, but on doing so free bleeding took place, and, as it seemed probable that this hemorrhage was coming from the distal end of the wounded artery, an elastic ligature was applied round the upper part of the leg, the finger being kept in the wound as a plug in the meantime. The sac was then opened freely by a wound about five inches in length and all the blood and clot in it sponged out. There was not very much clot, the contents consisting principally of fluid arterial blood. By this proceeding two openings were clearly exposed at the bottom of the sac. These openings were parallel to one another at a distance of about an eighth of an inch in the longitudinal direction of the limb. They were both about a quarter of an inch in length, and had the appearance of slits with little gaping of the edges. A probe passed into each opening determined the fact that one communicated with the canal of the popliteal artery, and the other with that of the popliteal vein. The canals of both vessels were pervious as far as the probe would pass above and below the wounds. The sac of the aneurism was well formed, circumscribed, and

white and smooth on its inner surface. The popliteal artery, being carefully cleared by dissection for a short distance, was ligatured above and below the wound with prepared catgut; and the popliteal vein, being cleared in the same way, was also ligatured above and below the wound with the same material. The tourniquet and elastic ligature were now removed, and a small artery and vein which bled, in the region of the wounded vessel, were tied also with catgut. A drainage-tube was then introduced into the cavity, and antiseptic muslin was applied in the usual way, after the edges of the wound had been stitched together. The whole operation was performed under the antiseptic spray.

On October 30th the report is that the patient had passed a good night. There was slight œdema of the foot, but the temperature of the limb was good.

On November 1st a small piece of discoloured clot with a few drops of purulent fluid escaped from the wound. The temperature of the limb was good, and the cavity of the wound was contracting. No pulsation had as yet been felt in the tibial arteries at the ankle. The œdema of the foot was less.

On November 8th the superficial portion of the wound was healed except where the drainage-tube was inserted. The cavity was contracting rapidly, and there had been no more purulent discharge. All the sutures were removed.

On November 17th the drainage-tube was removed, the cavity having contracted. There was only a small superficial sore where the tube had been introduced.

On November 26th the antiseptic dressing was removed, and solution of boracic acid applied to the small sore which remained. There was still a slight œdema on the side of the foot on which the limb rested. Pulsation in the tibial arteries remained absent.

On December 1st the wound was quite healed, and the patient was allowed to leave his bed, and go about the ward on crutches. There was a little weakness of the foot, but the knee-joint and limb were perfectly movable and strong.

On December 26th the patient walked freely without support on the affected limb, the foot of which still remained somewhat weak.

Remarks.—The case just reported is one of great importance in connexion with the surgery of the bloodvessels. The absence of the peculiar thrill which has always been considered diagnostic of arterio-venous aneurism is a point of interest. Had the operation not so distinctly disclosed the presence of a wound in both artery and vein, I and those who saw the case would have looked upon it as one of *traumatic aneurism of the*

popliteal artery. The reported cases of traumatic arterio-venous aneurism of the large arteries are not numerous, but in most of these, as far as I can ascertain, this symptom was observed, and directed attention to the true nature of the case. An examination of the wounded popliteal vein, made at the time of the operation, did not discover any appreciable dilatation of its canal, such as has usually been noticed in arterio-venous aneurism, and therefore I am inclined to think that, although a wound in both artery and vein communicating with the aneurismal sac existed, there was little or no communication through these wounds between the arterial and venous circulation. This conjecture may be explained by the longitudinal direction of the wound in the vein, and its position in regard to the corresponding wound in the artery. Be the explanation what it may, the fact of the absence of the peculiar thrill in this instance must be considered as quite exceptional in connexion with arterio-venous aneurism.

The most instructive part of this case is a consideration of the treatment which was successfully adopted. Mr. Holmes in his very valuable lectures on this subject, directs attention to the methods of treatment which have been employed in cases of arterio-venous aneurism of the femoral vessels. These methods may be enumerated as (1) ligature of the artery after the Hunterian plan, (2) compression, (3) ligature of the artery above and below the sac without opening the latter, (4) laying open the sac and tying the artery above and below the wound, the vein not being interfered with.

A consideration of the treatment of the reported cases of arterio-venous aneurism shows that the *first* of these operations has proved most unsatisfactory; that the *second*, when it can be applied accurately, so as to cause obliteration of the venous communication, has proved and is likely to be useful; that the *third*, although it has proved successful, is only applicable in certain cases, and necessitates a difficult dissection; that the *fourth*, although it has proved successful, is attended with great risks—(1) from venous hemorrhage, (2) from purulent absorption.

The method employed in the case related has, as far as I am aware, never before been practised, but it is only just to state that Mr. Holmes, in his remarks, suggests the advisability of this proceeding, and refers to instances where both arteries and veins have been obstructed or ligatured without bad consequences following.

The result of the operation in my case tends to prove that surgeons have taken a too serious view of the risks likely to follow the ligature or obstruction of the principal artery and vein of a limb. One principle in all former operations for the

relief of arterio-venous aneurism has been to avoid any interference with the vein, but this case has now practically demonstrated that both artery and vein may be successfully ligatured.

Should carefully-applied compression fail to relieve an arterio-venous aneurism, my recent experience inclines me to advocate the operation performed in the present instance, provided the case be one otherwise suitable for an operation.

The advantages of this plan are, in my opinion, (1) certain closure of the openings of communication in both artery and vein; (2) absence of any risk from venous hemorrhage or absorption in connexion with the wounded vein; (3) its practicability in the large majority of cases; (4) its easy performance without much dissection.

By the employment of the antiseptic treatment in the present case, all local irritation in connexion with the sac and wound was prevented, and suppuration was limited to the single discharge of a few drops of innocent pus.

In consequence of these facts, I consider myself justified in attributing to this treatment much of the success of the case, and I would therefore recommend its adoption with great confidence in this class of operation.—*Lancet, April* 24, 1875, *p.* 568.

45.—FORTY CASES OF NÆVI SUCCESSFULLY TREATED WITH ELECTROLYSIS.

By S. J. Knott, Esq., Medical Superintendent of Galvanism to St. Mary's Hospital, late Medical Tutor and Pathologist, &c.

I think I have related below a sufficient number of cases to show the value of the treatment I wish to advocate. I use Stöhrer's and Meyer and Meltzer's continuous batteries, and judge according to the size of the nævus how many cells to use —six or eight is about the average if the battery is in good working order. If the nævus is small I use one or two needles attached to the negative pole, and one to the positive, and pass them into the tumour; but if large, I put on several needles in the negative cord, and use charcoal point with the positive. After the needles have been in the tumour a short time decomposition begins to take place; this is shown by bubbles of gas passing by the side of the needles. A clot is then formed, the tumour turns of a bluish white, and in this clot fibrous degeneration takes place, and ultimate cure is the result. The advantages of the galvanism are its certainty of action, its safety, the faintness of the cicatrix, and the cessation of pain directly the operation is over. I have used every other method, and I certainly think this by far the best.

R.D., aged four months. This child had a venous nævus on

the end of the nose, which made the latter look blue and bulbous. Two needles were applied on the 4th of December, 1872. The child was not seen again till the 20th of the following April. It was then quite well.

A. S., aged four months and a half, was brought to me on the 21st of March, 1873, with a capillary nævus on the inner side of the right labium magus, about the size of a split almond. Two needles applied. Discharged cured on April 26th.

E. T., aged five months, was brought to me on the 21st of October, 1873, with a capillary nævus of the right eyebrow, about the size of a sixpence. Two needles used. Had a second application on 30th. Discharged cured on November 12th.

J. S., aged six months, was brought on December 21st, 1873. this child had four nævi, all of them capillary; one on the right side of the throat, measuring an inch and a quarter by one inch; one on the left cheek, which was an inch and a half in circumference, and had several small superficial vessels running into it; one on the chest, just above the xiphoid cartilage, and one on the back, both about the size of a shilling. This case took some time to cure, as I only treated one nævus at a time, the one on the cheek requiring four applications, the tributary vessels making the matter complicated. She ultimately got quite well, and the tributary vessels, when the nævus was cured, gradually disappeared.

A. G., aged fourteen months, was brought on January 13th, 1874, with a large nævus on the right side of the neck an inch and a half by one inch. Had had nitric acid applied by own doctor six or seven times. It presented a curious appearance, being white in places where the acid had burnt through the epidermis, the red surface of the nævus appearing in the other parts. The mother said it was spreading fast downwards. As it was a large one, I contented myself with applying the needles all round the margin, and two days after at the centre. It was operated on three times. Discharged cured on March 15th, 1874.

A. W., aged five months, was brought on Jan. 19th, 1874 Had a capillary nævus on the right back, just below the scapula. It measured an inch by half an inch, Was operated on twice. Discharged cured on March 7th, 1874.

E. C., aged five months, came on the 19th of January, 1874, with an arterial nævus on the forehead, about the size of a sixpenny-piece. Two needles were used. Discharged cured Feb. 7th, 1874.

K. H., aged three months, came on February 16th, 1874. Had two nævi: one about the size of a split-pea, situated on

the border of the left upper eyelid; and the other about twice the size, on the upper lip. Two needles were used to these, and they were quite well in three weeks.

A. P., aged seven years. This child came from Yorkshire, and was taken into the hospital on April 15th, 1874, suffering from a large venous nævus, which occupied the whole of the lower lip, and had extended over the alveolar process. The lip was much thickened, and looked blue; it hung away from the teeth, and the inner surface was turned outwards. There were three places, about the size of a threepenny-piece, where the nævus had penetrated to the surface. She was placed under the influence of chloroform, and five needles were passed into the lip from above downwards, and attached to the negative pole, the positive, with charcoal point, being applied in the neighbourhood. The operation was performed six times, in the same way, on an average of once in ten days. She left the hospital quite well, no sign remaining of either the disease or the treatment.

A. S., aged two months, was brought to me on the 14th of May, 1874, with a capillary nævus on the lower eyelid, left side, about the size of a small pea. This was treated with two needles, only one application being required for its cure.

H. W. C., aged eight months, was brought on the 13th of August, 1874, with a capillary nævus on the side of the nose, near inner canthus of eye, about the size of a split bean. This was rather difficult to get at with the needles, and so had to be done twice. Cured.

F. B., aged eight weeks, was brought on Feb. 1st, 1875. This case was a peculiar one. There were five venous nævi on the right arm, two situated above and behind the elbow, two on the outer side of the forearm, and one large one situated at the bend of the elbow, and reaching from the middle of the joint in front to the olecranon, and in circumference about the size of a half-crown, the whole surface being in an ulcerated state. It had been under medical treatment, the mother said, for five weeks. The slightest touch would make it bleed. It was hard to the touch, especially round the base; could be moved away from the structures underneath. Two needles were used freely, and in two days after it took on a healthy aspect and began to heal, and on March 1st was quite well. I have commenced to treat the others.

L. P., aged fourteen weeks, was brought to me on March 1st, 1875, with a very large capillary nævus. It is four inches by three and a half; it commences in the left supra-scapular region, covers over the whole extent of the clavicle, extends upwards to the root of the neck, and runs downwards nearly to the nipple. I passed five needles into the lower border

attached to the negative pole, and applied the positive pole to the neighbouring parts (ten cells were used), and kept them there till a firm clot was formed. It will take four sittings to complete the operation. Is going on very satisfactorily at present.—*Lancet, March* 20, 1875, *p.* 401.

46.—ON A CASE OF VARICOSE VEINS, TREATED BY A NEW OPERATION.

By JOHN MARSHALL, Esq., F.R.S., Surgeon to University College Hospital.

[In this case of varicose veins, Mr. Marshall performed what is in some respects a novel operation. The patient was a farm labourer, 38 years of age.]

The internal saphenous veins are extremely varicose in both limbs. On the left side, below the knee, the vein is very large and tortuous; the part above the knee is straight, and at the saphenous opening it forms a soft bulging tumour. On the right leg the disease is similar, but less marked. There is an enlarged gland in the left groin; the glands in the right groin are shotty. No tumour can be felt in the abdomen. The liver apparently is neither enlarged nor indurated; but he has drunk a good deal of beer. On both legs below the knee, and on the left thigh, is a papular rash—lichen pilaris. He suffers from constant pain in both legs, and is quite unequal to his customary work.

Operation, Nov. 14th. After standing for half an hour with a carbolised cloth round the left leg, the patient was put under chloroform, and I then marked on the skin with ink the course of the tortuous vein below the left knee for about nine inches. At each end of this mark I ligatured the vein by means of a pin passed under the vein, with a piece of bougie and a figure-of-8 suture over the vein; two other similar ligatures were placed above the upper one at distances of two inches apart, and a fifth ligature was placed two inches below the lower one. The pins, bougie, and threads had all been previously carbolised. Esmarch's elastic bandage was then applied to the whole limb, with the effect of completely emptying the varicose vein, even in the intervals between the several pins. I then made a straight incision through the skin from the top to the bottom of my tortuous ink-mark, and, with a director and knife, slit up the vein along the whole of the exposed portion. As the vein then formed a very large, irregular, folded mass at the bottom of the wound, I passed a ligature round it above and below, and *removed it entirely* with forceps and scissors, cutting through two large veins opening into it. A

strip of carbolised gauze was then placed in the wound, and the limb put up in the complete antiseptic dressing. The operation was done under the carbolised spray. I may here observe that there was *no bleeding whatever* during the operation.

Nov. 15th. Leg feels stiff; dressings not disturbed. Temperature 99·2°.

16th. No pain. Temperature 99·6; pulse 68.

17th. Temperature 98·6°; pulse 68. Dressings removed for the first time; no evidence of hemorrhage in these. Wound partly covered with lymph; a red blush extends for two inches round it. No redness round the pins; some redness between the upper two pins. The unremoved parts of the vein are filled with clot.

Jan. 5th, 1875. Patient discharged from the hospital, the diseased vein being satisfactorily obliterated above and below the part that has been removed.

Remarks.—Now the original cause of this man's varicose veins must no doubt be looked for in some mechanical hindrance to the circulation, some impediment to the return of the blood from the lower limbs, dependent on laborious work in the upright posture. Neither the syphilis nor the rheumatism can be held responsible for the local affection, for this begun at an early age, before he had been affected by either disease; nor is it understood that syphilis in any direct way predisposes to varicosity of the veins; nor does rheumatism, except by affecting the heart. At the same time all impairment of the general health must lessen the force of the circulation and weaken the coats of the veins.

As a rule, the veins of the leg gradually enlarge upwards from a little above the ankle; but here they are said to have become dilated almost simultaneously from groin to ankle, pointing apparently to some cause of embarrassment to the circulation acting from above downwards. Notice, however, in this case, what is so frequently observed, the great bulging of the saphenous vein just before it entered the saphenous opening—a condition so constant as to have suggested to Mr. Herapath that narrowing of this opening was the cause of the disease, and he accordingly enlarged it for the cure. This idea has, however, been long exploded, for the deep veins of the limb, which have no relation to this aperture, are also liable to become varicose. Nevertheless, when the upper part of the saphena vein has already become enlarged, its unusual dilatation in this position may be explained by the then increased pressure on its sides caused by the margin of the saphenous opening.

Not attempting here to discuss the *pathology* of this affection fully, I will merely state that, the primary cause being held to

be some mechanical impediment to the return of the venous blood, it happens that if this acts temporarily with healthy veins, the effects are only temporary, as is so frequently exemplified in the varicose condition of the veins which is produced during pregnancy, and entirely and rapidly disappears after parturition. But if the cause act continuously, or if the veins themselves become weakened or their valves disorganised, then the over-distension becomes *confirmed*. There next occurs a further diminution of elasticity and contractility in the venous coats (even though these become thickened) owing to the proper tissues becoming gradually atrophied, and being, as it were, replaced by a dense connective tissue. The valves also become incompetent, stretched out, or destroyed; and so the weight of the whole column of blood acts on the whole vein, which then becomes permanently enlarged and elongated.

Turning now to the *treatment* of varicose veins, it must be said, first of all, that cases in which there is no constant or severe pain, no ulceration or hemorrhage, or no impediment to the performance of the ordinary duties of life, are to be dealt with by friction, position, cold, and bandages. But more severe cases, such as the one here described, may be treated by various operations, the more recently suggested ones all having for their object the *closure of the diseased veins*. This is by no means easy to accomplish; for fortunately, as regards the well-being of the economy, the lining membrane of veins does not readily undergo the adhesive inflammation. Moreover, at best the cure is temporary, as some of the neighbouring or anastomosing veins take on the varicose state after a certain time. But as such operations afford relief for months, and in some cases for years, the temporary character of this relief is no absolute bar to their performance. Now, a vein is best obliterated not by pressing the sides against each other, for its internal surface, as just said, is not prone to adhere, but by stopping the circulation through it, which renders it useless to, or unemployed in, the economy; so that, in accordance with the general rule as regards useless or unused parts, it shrinks and disappears. But in addition to such changes which occur naturally in the closure of the umbilical vein and ductus venosus, for example, most operations for the cure of varicose veins intentionally promote the formation of a *clot* in their interior, which clot, adhering to their walls and slowly contracting, first draws the sides of the veins together, and afterwards becoming the seat of organisation undergoes further contraction and ultimate absorption, the veins themselves being then closed, and finally reduced to mere cords. Various processes accordingly contribute to this end.

In considering the numerous operations that have been pro-

posed for varicose veins of the lower limbs, we find that some, relying on the adhesive process only—as, for example, simple long-continued pressure—are inefficient; others, such as the method by cautery or caustics, which produce sloughs, are tedious; whilst many, such as those by excision, incision, seton, galvano-puncture, or injections, are dangerous to life. The dangers lie not so much in the possible occurrence of local phlebitis and periphlebitis, as in the possible formation of soft or unhealthy or imperfect clots, which, with or without accompanying suppuration, may loosen, break down, and originate emboli, or set up septicæmia or pyæmia. This danger is so serious as to cause considerable anxiety in the mind of the surgeon who has to deal with a case of varicose veins requiring operation. The injection of tannic acid or of perchloride of iron into the vein is especially dangerous, and so also are the galvano-puncture, and the passage of hairs, threads, or wires across the vein, as the clots thus formed are partial, and liable to be detached; galvano-puncture is, moreover, very painful. Caustics and the actual cautery are not now employed, as the destruction of the skin necessary is quite useless, greatly prolongs the period of treatment, and certainly does not lessen the chances of septicæmia. Extirpation of small knotted portions of a varicose vein was practised by the old surgeons; but this method was not applicable to long or tortuous veins, and involved great risk. Boyer first ligatured and then cut into the vein, whilst Bell tied and then removed some portions of the vein. But the mere laying open often failed, as the channel was restored again in many cases. To obviate this, Gräfe laid the vein open, and then plugged it with lint to ensure its healing by granulation. Experience soon revealed that such severe operations were too dangerous, so that modern surgery has recourse to milder methods of cure, all of which adopt the principle variously modified of attempting to close or obliterate the vein at intervals by means of ligatures, wires, or pins, by which the vein is for a time compressed. After all these operations, however, the vein often opens again, partially or completely, so that a further, and when successful, a more satisfactory proceeding is employed by some—viz., the subcutaneous incision of the vein between the ligatured parts. Sir Benjamin Brodie frequently performed this subcutaneous section, followed by pressure, but abandoned it as ineffectual. It is Mr. Henry Lee that introduced a combination of the ligature with the subcutaneous section; but undoubtedly this plan does involve the risks attendant upon cutting into veins, from which the subcutaneous character of the section does not always protect us. This complex proceeding has indeed been followed by troublesome and even fatal results. Thus, the choice may be said to

lie between a comparatively safe but only temporarily beneficial, or quite inefficient operation, and a really efficient but somewhat dangerous one; and be it remembered that even the interrupted ligature alone, without intermediate section of the vein, is not free from risk. It was natural to suppose that the antiseptic method of treatment might be employed for these or still bolder operations on veins with great advantage, if it would prevent the occurrence of those processes which so often end in suppuration or softening of the clot—pyæmia or septicæmia; and that thus it might render operations on veins as free from danger as others of a more simple nature. Accordingly, I first employed this method in three cases, when using the ordinary pins and figure-of-8 sutures; in each the result was most favourable, for there was no suppuration whatever around the pins, and no fever, and the cases terminated in from five to seven weeks. This success encouraged me to attempt the more formidable operation I have just described, for, as I have before said, the simple ligature only accomplished a doubtful or brief cure as a rule. It was my intention at first merely to slit up the vein and plug it with antiseptic gauze; but at the operation the thickened, dilated, and tortuous vessel, when opened, formed, with its incurved edges, such an irregular and loosened mass to leave in the wound, that I then determined to remove it entirely, and I am sure now that this is the better plan. In future, I should make an incision through the skin in a direction best suited to the position and form of the straight or tortuous vein, expose the vessel, which is very easy of accomplishment, put a carbolised ligature on it above and below, and then seize one end of it with a tenaculum forceps, and dissect it out. The application of Esmarch's bandage renders this operation perfectly bloodless, and no subsequent hemorrhage need be feared from the lateral veins, however large, which open into the part removed, for this is prevented by a long pad of gauze placed in the wound. It is very interesting to observe that after the antiseptic dressings had been discontinued a part of the vein treated by the pins and subcutaneous section inflamed and suppurated badly both outside and inside the vessel, whilst merely a tranquil process of granulation and separation of primary clots occurred at the orifice of the divided veins in the principal wound. Hence this one case enables us to contrast the dangers of the two methods of dealing with a diseased vein—namely, ligature with subcutaneous section, and complete removal,—for the two parts belonged to the same patient and were under exactly the same circumstances. It will be noted that there was a total absence of fever in this case until the erysipelas set in, which was quite an accident, and probably might not have occurred if the

antiseptic dressing had not been discontinued. Again, with the ordinary pin operation the case is never to be considered over before eight or ten weeks; in this case the man left the hospital in between seven and eight weeks, and had it not been for the erysipelas even this period would have been shortened. The result of the operation has thus far been most satisfactory: the part of the saphena vein below the excised portion is completely obliterated; and as the upper part is no longer fed by a long column of blood, it has also become contracted, and, indeed, cannot even be felt until a point is reached where it receives a collateral branch from the back of the thigh. No superficial veins are at present unduly enlarged.

Thus, then, I think we have a most efficient operation for bad varicose veins, rendered easy of performance for the surgeon by the *use of Esmarch's bandage*, and safe for the patient by the employment of an *antiseptic method of treatment*. It will, of course, be understood that the extent of vein to be removed must be left to be determined by experience and by the actual necessities of any given case.—*Lancet, Jan.* 23, 1875, *p.* 113.

ORGANS OF RESPIRATION.

47.—DIVISION OF THE ISTHMUS TO RELIEVE DYSPNŒA IN CERTAIN CASES OF BRONCHOCELE.

By Sir G. Duncan Gibb, Bart., Physician to Westminster Hospital.

[When the isthmus of the thyroid gland is enlarged there is usually a good deal of dyspnœa from pressure upon the trachea, to which very soon it becomes strongly adherent. A case of this kind may end fatally from extension of the lateral lobes around the trachea. This extension is sometimes very rapid, and the compression is so great that only a narrow oval fissure will be found after death to be all that the patient could breathe through during life.]

I had long thought over the matter, and came to the conclusion that the only remedy in such cases was to remove or divide that portion of the bronchocele which was in contact with the trachea itself—namely, the isthmus,—*before* it had commenced either to encircle the tube or had become too firmly adherent to it. This last summer the opportunity was afforded me to have this practice tried, and I am happy to say with the best results. The symptom that was the most urgent was dyspnœa, owing to the pressure of the enlarged isthmus, which had formed a distinct tumour over the trachea nearly the size of a walnut. This was adherent to the deep fascia over the

trachea, and moved up and down with the tube and thyroid cartilage in the act of swallowing. Great distress and discomfort, the feelings of the most miserable and desponding nature, were almost constantly present, invariably aggravated by attacks of recurrent dyspnœa. I was satisfied the lateral lobes were dipping backwards, and in a few weeks or months would have irretrievably compressed the trachea.

On the 11th, after chloroform had been given, an incision was made through the integuments in the median line over the trachea, about two inches long, the superficial fascia and then the deep were divided on a director, and, finally, the surface of the tumour was exposed, which in size approached that of a flattened walnut. The isthmus on either side of this was more slender and smaller in bulk than the tumour, which permitted of a strong ligature being placed on either side of it with the aid of an aneurism needle. The isthmus was then freed to the inner side of each ligature, divided, and wholly removed, the trachea being observed to be quite free. There was not much bleeding, although several small veins ramified on the surface of the tumour. Subsequent examination showed the removed isthmus to be partly cystic in its character, for on section, one cyst especially was divided, giving exit to some fluid; the remaining portion looked like degenerated glandular tissue.

By the 14th the wound was nearly healed; on the 17th the last ligature came away. A few days later the wound was perfectly healed, and she left the hospital, feeling no inconvenience about the trachea in breathing or swallowing. The relief afforded by the removal of the isthmus may be described as truly wonderful.

On the 16th of November she called upon me in perfect health; she had got stouter, had married, and there was not a trace of her old symptoms. The trachea could be felt uninterruptedly free from the root of the neck upwards, and the enlarged thyroid gland on either side seemed to have receded from the median line, and was less prominent.

The results in this case fully justified the hopeful view entertained of the operation, and it was not long after that another opportunity was afforded of again trying its effects, under circumstances somewhat differing and even more unfavourable.

Alice D., aged seventeen, a healthy-looking girl, was sent to me by my friend Mr. M. W. Chambers, of Sutherland-street, Warwick-square, with general swelling of the entire front part of the neck, especially above the clavicles, from enlargement of the thyroid gland, which, it appeared, had existed since her birth. Whilst there was an unusual fulness of the neck, there was

not the great prominence observed in most cases of bronchocele; yet the swelling was traversed by numerous enlarged and tortuous veins, through its extension behind the clavicles and pressure upon the subclavian and other deep-seated veins. This gave rise to some facial turgescence and a ruddy complexion. The isthmus was felt continuously from the one side to the other, and was closely applied to the trachea, giving rise to occasional dyspnœa, dysphagia, laryngeal cough, and general discomfort, which had induced the girl's mother to seek advice for her. She was admitted into Westminster Hospital under my care, and put upon preparations of iodine internally, and the use of the bromide-of-lead ointment, as in the first case. She certainly improved, and the swelling became softer. But in the early part of December she had symptoms that simulated an attack of laryngitis with such extreme dyspnœa for two or three nights that the house-surgeon was called up to open the trachea. Fortunately relief was obtained without resorting to that measure, and she got better; but as it was hopeless to expect a cure, or even permanent relief, whilst this enlarged isthmus remained, I concluded that surgical interference might do more than medicine, and requested Mr. Holthouse to see her. As everything was favourable he consented to remove the isthmus. On the 15th December she was narcotised with chloroform, and as she had eaten some food shortly before, this was vomited, and during the act the prominent isthmus was seen to mode up and down synchronously with the thyroid cartilage, pointing to close and firm attachment to the trachea. An incision was made one inch and three-quarters long below the thyroid cartilage, which divided a small vein that had to be tied; another, rather large, coursed upwards from right to left, which was avoided. The superficial and deep fascia being divided upon a director exposed the isthmus, which suddenly cropped up like a hernial tumour. This was found to be fully an inch wide, proportionately thick, and firmly attached to the trachea. Mr. Holthouse cautiously detached it by means of curved scissors, and then passed an aneurism needle under it, armed with a double ligature permitting it to be tied in two places, as wide apart as possible. As these ligatures were likely to become detached in the event of division of the isthmus, it was considered prudent, with my concurrence, to leave them in to slough out, and thus avoid the risk of hemorrhage. The wound was closed and the patient conveyed to bed. Without giving the progress from day to day, it may be stated that everything went on well, the ligatures came away in a reasonable time, there was some free suppuration of the portion of the isthmus between the ligatures, and finally the wound healed. The general turgescence of the face

seemed to have wholly gone, and the decided prominence of the neck became less, the circumference having become reduced from $14\frac{1}{2}$ to $13\frac{1}{2}$ inches. There was a disappearance of several of the cutaneous veins, except at the lower part nearer the clavicles. The relief to the general tension across the neck was the chief point gained, and no discomfort was experienced such as had been present before the operation. This can be well understood, on reflecting that the isthmus was then exerting a pressure upon the trachea and adjacent parts like a strong band tied around the neck.

That the results will be as favourable here as in the first case there is good reason to believe, but I should prefer as a rule a good large portion of the isthmus to be removed to simple division, as there is less likelihood of any subsequent adhesion to the trachea; and as to the hemorrhage from a divided portion of the gland, I think the danger to be feared from it is much overrated.

Although the enlarged thyroid gland has been wholly removed several times with success, and quite recently by my friend Dr. Fenwick of Montreal, by Dr. Wolfred Nelson of the same place, and by Dr. Beaumont of Toronto, yet I believe that this is the first occasion in which the isthmus has been either wholly removed or divided, at my suggestion; and the extreme importance of the subject is my excuse for bringing it before the notice of the profession. I have no doubt that this new remedial measure will receive a fair trial, and I feel confident that it will become one of extreme value and importance in a very dangerous class of cases.—*Lancet, Jan.* 23, 1875, *p.* 121.

ALIMENTARY CANAL.

48.—TREATMENT OF FISSURE OF THE ANUS.

By Dr. Erskine Mason, of New York.

[In a clinical lecture delivered by Dr. Erskine Mason at the New York Charity Hospital, we find the following useful observations on the treatment to be pursued:]

This may divided into medical and surgical; the latter, however, is by far the most satisfactory in every way, and we might almost say in a moment cures the patient. Under the head of medical treatment we place, first, the use of mild cathartics, so as to render the fæces more soluble. This, however, but mitigates suffering for a time. Second, the application of astringents and sedatives, as belladonna, zinc, tannic acid, nitrate of silver, &c., to the fissure itself. This certainly will greatly relieve the pain at times, and in young children—

and, at times, even in adults—has been known to cure; but you should not place too much dependence upon it, nor waste time by a prolonged use of these means. When they act as curative agents, they do so by destroying the exposed filaments of nerves in the fissure or ulcer, and the parts are then put in a state of rest, and the fissure takes on healthy action and heals.

Our surgical treatment acts just in this way—viz., by putting the parts at rest. This is accomplished by either of two methods: over-distending the sphincter, paralysing it for a time, by means of the fingers, or dividing the muscle with the knife. Over-distension is now perhaps more frequently done in this city, certainly in this hospital. When you use the fingers, which I think are far better than an instrument, you place your two thumbs well into the rectum, so as to include the whole of the sphincter, and then, grasping the buttocks with the fingers, you forcibly distend the sphincter as you bring the thumbs against the tuberosity of the ischium. This, at first sight, may appear a very rough and harsh mode of operating, and is so regarded by some, who, I believe, for this reason denounce it; and again, because it has been said to give rise to undue laceration of the tissues and troublesome hemorrhage. I have resorted to this means a great number of times, and have never seen any but good results follow. When we use the knife, we draw the blade through the centre of the ulcer or fissure, so as to divide the mucous membrane and some or all the underlying muscular fibre of the sphincter. Whether to divide all or only a portion of the muscle is a disputed point. That a superficial incision will suffice, in many cases, in relieving pain and curing the disease, I know from personal experience; and it does so just in the same way that a caustic may act, viz., in dividing an irritable or inflamed nerve. Should you desire to be more certain of the result of the operation, a free incision of the muscle, thus securing a longer period of rest to the parts, is best, and by many this is always made. . . . . Some have seen fit to combine both these methods; and in some instances this may be of service. Thus, a few weeks ago, after stretching a muscle as far as I deemed it safe, and yet on withdrawing the thumbs it did not appear as if distension had accomplished enough to paralyse or impair its tone, I drew a knife through the fissure, and the result was most gratifying. Both methods have their strong advocates; they are both excellent, and will accomplish a cure. If you operate without ether, the knife is the less painful, and if the fissure is but slight and superficial, a slight incision is all that will be required. Should the patient (as some always do) have a great dread of the knife, we can effectually relieve them by

means of our fingers. Though myself practising over-distension more than incision at present, I am not quite prepared to recommend one method as much superior to the other. In those cases which, for want of a better name, we call neuralgic affection of the rectum, and which are often accompanied by spasmodic contraction of the sphincter, we have a group of symptoms very like those caused by fissure, yet no ulcer or fissure is detected. In such cases over-distension of the sphincter is the operation to be practised. With respect to after-treatment there is little to be said. As a rule it is but [not ?] necessary to keep the patient in bed; but for a few days you had better keep him quiet, preventing his taking exercise, as walking, or standing for any length of time. I have had patients, after the operation of incision or over-distension of the sphincter, resume their ordinary occupation on the following day, and no trouble follow. I do not, however, advise you to allow your patients to do so in cases where you can prevent them. After the operation, patients, as a rule, are at once relieved of pain, and are rapidly restored to health. In weak nervous patients, who have long been sufferers, some little interval will at times elapse before all the symptoms from which they formerly suffered will cease. And here you must pay attention to their general condition—such as the use of tonics, proper diet, and outdoor exercise. In speaking of the operation by incision or dividing the sphincter, I omitted to tell you that, even if there be more than one fissure present, one incision will suffice, that being sufficient to place the parts at rest. In cases of perineal (*i.e.*, where the fissure is situated in the front part of the anus) fissure in the female, do not be too free with your incisions in that direction, else incontinence of fæces may follow. This no doubt is due to the action of the transverse perineal muscles as well as the other muscles around the vagina which take origin from the perineal centre or body, by their traction keeping the parts from healing. Again, by a too free incision in this locality we may weaken the part which is known in the female by anatomists as the perineal body, upon which the integrity of the female perineum depends.—*Medical Times and Gazette, Feb.* 20, 1875, *p.* 211.

49.—ON OPERATIONS FOR THE RADICAL CURE OF HERNIA.

By Charles Steele, Esq., Surgeon to the Bristol Royal Infirmary.

[The two operations which have obtained most support from the profession are Wutzer's and Wood's. Both, however, have fallen into disuse—the first in consequence of want of perma-

nent benefit in many cases, and the latter, because it has been fatal to several patients, although very successful in its author's hands. If, however, an operation could be devised, offering a good prospect of permanent success, with but little risk, its use might become popular in the profession.]

George Barwell, aged eight, was admitted under my care, into the Bristol Royal Infirmary in May 1873, with large congenital inguinal hernia of the left side, for the radical cure of which by operation his parents had four years before been advised to bring him to the infirmary when he reached the age of eight years. Having had some cases of union by first intention in operations for strangulated hernia, when Lister's dressing was used, I had regretted that I had not stitched the pillars of the rings together with carbolised gut, and thus probably prevented the return of the hernia. Acting on this idea, I operated on this boy in the following simple manner. I made an incision, an inch and a half long, parallel to and between the pillars of the external ring, and dissected down carefully till the pillars were clearly exposed. I endeavoured to roughen their edges by scraping them with the scalpel, and then introduced two catgut sutures at a fair distance from the margins, laying the needle flat against the inner surface of the tendinous tissue, to avoid wounding the peritoneum (both rings being drawn close together, owing to the long duration of the hernia), and tied these ligatures firmly, leaving room for the spermatic cord, cut the ends off close, and then united the skin with the same material and applied the carbolised dressing. The whole operation was performed under the carbolic acid spray. No pyrexia, peritonitis, or bad symptom followed; slight tenderness only in the wound was felt. The child did well; the deep parts united firmly, the superficial granulated; and, after a week, simple ointment was substituted for the former dressing. All was healed in three weeks. The boy was kept in bed as a precaution for a week longer, then allowed to get up, and soon afterwards to return home to the country, where for six months, without a truss or any support, he played about freely without any recurrence. He was brought up meantime every month for inspection, on each of which occasions the parts were found quite firm and sound. But at the end of six months, owing to some unusual exertion, a sudden descent and strangulation took place, and the boy was brought to the infirmary. On examination, the scrotum was seen to be enormously distended, quite four times as large as with the original hernia. It seemed as if all union had given way, and much more intestine than before had been forced through the opening. But by palpation, I found that the

scrotum was full of serum suddenly exuded through pressure on the veins of the cord by a sudden strangulation of the intestine, which proved to be a very small portion. I tapped and drew off the fluid, and, the intestine being returned, the symptoms ceased; yet, during successive days, the gut descended and opened up the orifice to nearly its former size.

My colleagues fully approved of my proposal to repeat my operation, as the case had done well for so long a time; and I accordingly operated as before, introducing three sutures instead of two, and leaving the cord a less free channel. All healed, as on the former occasion, with no bad symptom; but, when the external wound was quite well, I applied a truss with a flat India-rubber pad, and desired that it should be always worn until I ordered its discontinuance. I learned by my former overconfidence to give time for effused lymph to become firmly organised.

It is now a year since the second operation. The boy was examined last week, after being without the truss for a day; no impulse could be felt; the deep union was firm, and the boy felt the part well supported. While I say that I thought out and performed this operation as an original matter, I do not assert that I originated the operation; in fact, it seems to me the most likely measure to suggest itself to any surgeon's mind when considering the subject, and I dare say several have performed it. On subsequent search, I find that Professor Gross, in his excellent System of Surgery, states that, in 1858, in a case of ventral hernia, he made a direct incision, pared the edges, and united the deep parts by silver wire-sutures, and the case did well; also that, in 1861, he performed a similar operation in a case of old scrotal hernia, and that, though a sharp attack of erysipelas followed, the result was satisfactory.—*British Medical Journal, Nov.* 7, 1874, *p.* 584.

50.—ON A CASE OF STRANGULATED FEMORAL HERNIA,

REDUCED BY LARGE INJECTIONS OF OIL, AFTER STERCORACEOUS VOMITING HAD EXISTED MORE THAN THREE DAYS.

By W. Adams, Esq., Surgeon to the Great Northern Hospital.

The case which I have thought worthy of being brought under the notice of the Society this evening, is one of great practical importance in reference to the treatment of strangulated hernia, and also of some cases of obstruction of the bowels in which the cause of obstruction is more obscure. The treatment essentially consists in the injection of a very large quantity of mixed oils—viz., two quarts of olive-oil, three ounces of castor-oil, and three ounces of turpentine, mixed

together; and this may require to be repeated. The injection is slowly performed, and a long gum-elastic tube, about nine or ten inches in length, is used. This practice of injecting oil was first brought under my notice by my friend Dr. Kavanagh of Deptford, who adopted it successively in a case of strangulated femoral hernia, the details of which I will now read to the Society.

On Thursday evening, March 13th, 1873, I was sent for by Dr. Kavanagh to a case of strangulated hernia at Deptford. I found the patient, Mr. B., aged 48, suffering from strangulated femoral hernia on the left side. The hernia was small, but well defined, and the symptoms were severe. All efforts to return the hernia by the taxis, aided by the warm bath, &c., had failed, and stercoraceous vomiting had set in at 4 p.m., the day previously (Wednesday).

The history of the case was, that on Sunday previously (March 10th) he had eaten heartily of veal for dinner, and that on Monday he did not feel well. He naturally attributed it to indigestion, and on Monday night took some aperient pills.

On Tuesday the 11th, the bowels acted slightly, but he felt ill, and complained of pain in the abdomen. He had no pain in the situation of the hernia; but was aware of the existence of the rupture, which, he said, had existed for thirty years, and had first occurred after being thrown out of a gig. He was doubtful whether it had ever been completely reduced, though it fluctuated in size, and he had never worn a truss.

On Wednesday the 12th, he complained of great pain in the abdomen, and vomiting set in; and at 4 p.m. this became of a stercoraceous character. Attempts were made by Dr. Kavanagh to reduce the hernia by taxis in the warm bath, but without success; and the patient persisted in his idea that the obstruction was in the upper part of the bowel, as there was still no pain in the rupture, and the pain was referred to the upper part and right side of the abdomen.

On Thursday the 13th, the patient remained in the same state, and in the afternoon I was telegraphed for. At 8 p.m., I saw him, in consultation with Dr. Kavanagh, who at once agreed with me in the propriety of operating. The patient, however, obstinately refused the operation, principally from his conviction that the obstruction was seated higher up in the bowels, there still being an absence of pain at the seat of hernia. After making an unsuccessful attempt to reduce the hernia by taxis, I returned to town.

On Friday the 14th, the patient remained in the same state, stercoraceous vomiting continuing every ten minutes. He still refused the operation. All nourishment, in the form of beef-tea, brandy, &c., was rejected as soon as taken. Dr. Kavanagh

resorted to the injection of oil, but without success, the oil being immediately rejected.

On Saturday afternoon the 15th, I saw him again in consultation with Dr. Kavanagh. The patient was then in an extremely exhausted condition, beef-tea and brandy being rejected as soon as taken; pain still continuing over the central and upper part of the abdomen, and absent at the seat of hernia. The abdomen was tense, and there was tenderness on pressure, but this did not exist in any marked degree in the neighbourhood of the hernia, so that the patient still held to his opinion that the obstruction was higher up in the abdomen. After a conference had been held with the members of the family, a very reluctant consent might have been wrung from the patient, but his wife still obstinately objected; and as, from the extreme exhaustion and abdominal pain, little hopes of success could be held out to the family, the operation was not performed, and I had no expectation of seeing him alive again.

On Sunday the 16th, I saw the patient again with Dr. Kavanagh, and was surprised to find that the hernia had been spontaneously reduced in the night (about 2 a.m.), and that the bowels had been copiously relieved. The patient was in a very exhausted condition, but free from abdominal pain and tension, and he had been able to retain a considerable amount of nourishment, having taken as much as half-a-pint of brandy and two pints of beef-tea.

In explanation of this extraordinary recovery, Dr. Kavanagh informed me that, seeing the apparent hopelessness of the case, he again resorted to the plan of injecting large quantities of oil. On the Saturday night, between eleven and twelve o'clock, he slowly injected into the bowel, by means of a long tube, nine or ten inches in length, two quarts of olive-oil, three ounces of castor-oil, and three ounces of turpentine mixed together. The effect of this was that, about 2 a.m., the hernial tumour receded completely, and between three and four o'clock the bowels were copiously relieved; beef-tea and brandy were now retained on the stomach. The patient remained in an exhausted and drowsy condition for some hours.

From this period, the recovery was rapid, and in a week he was able to resume his business avocations. He has worn a truss ever since, and is now in good health.

Dr. Kavanagh informs me that in three other cases of intestinal obstruction, accompanied with stercoraceous vomiting and intense abdominal pain, but without external hernia, he has successfully adopted the same practice of persevering with the injection of large quantities of olive-oil, mixed with castor-oil and turpentine. In one of these cases, the symptoms had

existed eleven days before he was called in; and the success was complete. In all the cases, the injections were not retained at first; nevertheless, they were repeated at intervals, and at last were retained; and to this steady perseverance no doubt much of Dr. Kavanagh's success in these cases has been due.—*British Medical Journal, Dec.* 26, 1874, *p.* 809.

51.—A CASE OF STRANGULATED HERNIA SUCCESSFULLY TREATED BY PNEUMATIC ASPIRATION.

By Dr. J. P. Bramwell, Visiting Surgeon to the Perth Infirmary.

[The patient was an engine driver, aged 50. Strangulation had existed about fifteen hours and the symptoms were urgent. Reduction, even under chloroform, was found to be impossible, and it was determined to aspirate the hernia, and if this failed to operate.]

With Dr. Nairne's consent I now proceeded to aspirate the hernia, which was very tense, elastic, and of considerable volume. The "previous vacuum" having been formed, a No. 2 needle (Dieulafoy's) was thrust at right angles to and well into the sac; on turning the tap about two drams of serous fluid and bubbles of gaseous matter were drawn into the instrument —a sure proof that the bowel had been perforated. The aspirator was now emptied and again set, and the needle drawn somewhat outwards. This change of position evidently placed the point in the hernial sac, out of which was drawn from four to five ounces of sero-sanguineous fluid. The tumour suddenly collapsed, and on manipulation the hernial protrusion was found to have disappeared. A full dose of opium was administered, and nothing allowed till morning, except a little iced water. First morning after operation: There has been some vomiting, and the epigastrium is tender on pressure. A small blister was applied to the part pained, and half a grain each of calomel and opium given every six hours. Second morning: Vomiting gone, pain greatly diminished. To have an enema of turpentine and castor oil. After this he had two free movements within six hours, which relieved him in every way. Feels hungry now, and is able to take light nourishment. Third day: All abdominal symptoms gone, patient convalescent, bowels have moved spontaneously. He was fitted with a good truss, and, in a few days, was able to resume his employment.

Remarks.—Judging from the archives of surgery, reduction of strangulated hernia by pneumatic aspiration is as yet quite a rare operation on this side of the Channel. In the last two

volumes of the Sydenham Year-book I have searched in vain for a single recorded case; the only approach to the operation being acupuncture of an inflated hernial gut, by Mr. Bryant. This, however, is not aspiration. Why an operation, the value of which has been proven in the most incontrovertible manner in France by many different surgeons, which has thoroughly established itself there, and yielded such splendid results, should be so little practised in our own country, is hard indeed to explain. This is all the more to be regretted when we consider how fatal an operation is that which is usually performed for the cure of a strangulated hernia. According to Brun-Buisson, half the cases operated on in France proved fatal. In 171 cases which I have collected from London hospital reports, the mortality was 46 per cent. Professor Spence has had admirable results—only 26 deaths in 127 cases; but even this gives 20 per cent. of fatal cases. Let us contrast this with Dieulafoy's recorded cases, operated on by the aspirator, where the death-rate was only 15 per cent.

With such facts as these before us, it becomes a very serious question indeed, whether any surgeon is warranted as a rule in performing the old operation for hernia, before having tried the simpler and safer plan of aspiration. The one, if not sufficient, does not preclude the use of the other. It has been said, with much justice no doubt, that the chief cause of death from operations for hernia is that the procedure is too long delayed, and the bowel thus irreparably injured. No doubt this is often the case, but I have seen enough of the operation to convince me that it has inherent dangers, apart altogether from the condition of the contents of the hernial sac.

Besides all this, we do know that a hernial protrusion which has resisted all attempts at reduction by taxis at one time, may some hours after be found reducible, and hence the reluctance to use the knife, knowing its dangers; but the safety with which the aspirator can be used would encourage us to resort to early operative interference of this simple nature, while we might shrink from the responsibility of using means of a far more risky character. Even the warmest advocates of aspiration in hernia do not pretend that it is of universal applicability. Its use will not tend to the reduction of a strangulated epiplocele, but can we always be certain with what we are dealing in such circumstances? Better give the patient the benefit of the doubt, and then operate in the usual manner if there is no reduction. Neither will it suffice *per se* to reduce herniæ complicated by bands of adhesion; but its use will, by reducing the size of the gut protruded, make the ulterior cutting operation easier. In a very small hernial knuckle, such as is not unfrequently found in the femoral region, little will be achieved by

aspiration. With these exceptions, there is abundant proof that the process is of wide applicability, and eminently useful for the reduction of herniæ resisting all efforts at replacement by taxis even when aided by chloroform freely administered. There can be little doubt that the general use of the aspirator would in such circumstances save many a useful life, which is sacrificed by the continued employment of a very dangerous operation for one incomparably safer and easier of performance. —*Edinburgh Medical Journal, Dec.* 1874, *p.* 500.

52.—CASES IN PRACTICE OF ILEUS AND STRANGULATED HERNIA, TREATED BY OPIUM—THE CASE OF ILEUS ALSO TREATED BY PUNCTURE.

By J. W. Martin, Esq., Portlaw.

In the year 1863 I wrote a short article on ileus, which appeared at the time in the Medical Press. I then said—"In many cases it is difficult, in most impossible, to form an accurate diagnosis of the cause of obstruction; our treatment must therefore be, in a great measure, empirical. This being the case, we should adopt that course of treatment most likely to prove serviceable in the greatest number of cases. This appears to me to be the early and steady administration of opium." I then had twenty years' experience of the advantages to be gained by this plan of treatment, at that time not generally adopted. Twelve years since have confirmed me in my good opinion of its value; indeed, at one time, I had the outlines of a *brochure* on the subject drawn up, intending to publish it; but, walking into Messrs. Fannin and Co.'s shop in Grafton-street one day, with my mind hot on the subject, I found myself forestalled by Brinton's very valuable little posthumous treatise on the subject, which contained all I had to say about it. Since then I had two or three cases, in which, having given opium freely for some days, the action of the bowels was induced by the use of enemata, containing several ounces of recent oxgall diluted with warm water.

The following case will be of interest, showing, as it does, that there are other measures which may be adopted with advantage, in addition to the foregoing.

I was sent for to a neighbouring village to see a man, aged seventy-five years; he had been attacked with colicky pains four days before, for which he had been treated with active aperients and enemata without producing any action of the bowels; the pain had increased; the abdomen had become much swollen and tympanitic; his countenance anxious; some vomiting; pulse 120, small, irregular; and he insisted that he was dying.

I introduced the O'Beirne's tube for twenty-eight inches, not only without difficulty, but also satisfying myself that, in this case at all events, it passed the sigmoid flexure; some flatus escaped; I threw in an enema of turpentine and oil mixed in emulsion. On withdrawing the tube an effort was made at expulsion, but without success. I introduced the tube again, and pumped out part of what I had injected, mixed with fæcal matter, but no relief was obtained. I then determined to puncture the distended bowels, and did so with a fine trocar and canula, about two inches below the ribs, on a line with the left nipple; much flatus escaped, but the tube at last became stopped with feculent matter. I then repeated the puncture about two inches more towards the linea alba with similar results. There was almost immediate relief from the extreme suffering, and one-third of a grain of morphia given subcutaneously procured some hours sleep; the dose was repeated by the mouth at night, and next morning there was free action of the bowels.

Visiting him six days afterwards I found him comparatively well, but suffering from diarrhœa, for which I prescribed an astringent chalk mixture, with laudanum. Yesterday, twelve days after, a neighbour of his told me he was quite well. There was not the slightest suffering or mischief from the puncture. I should say that I took care, by compression, to keep the peritoneal surfaces in contact while the instrument was penetrating the bowels. This case leads me to make some remarks on the value of opium in cases of incarcerated hernia.

In a paper I wrote on the subject some years ago—I cannot recall to mind in what periodical or at what date—I drew attention to the practical distinction to be made between strangulated and incarcerated hernia. I would now again address myself to the point.

A sharp line of distinction cannot be drawn, but tact, attention, and practice, will enable us soon to settle approximately the symptoms which should decide us on either proceeding promptly to operation, or adopting other courses with a view to promoting the return of the hernia. I would say that, if the patient be young and healthy, the hernia recent, small, tense, and painful to the touch, with the abdomen hard, and either retracted or distended and tympanitic, prompt operation is the safest remedy. But in the aged—when the hernia is large and of long standing—when, if a truss has not been worn, the parts have had time to accommodate themselves to the abnormal state, or, when a truss being worn, a large mass suddenly protrudes; when handling gives but little pain or suffering—in such, I think, other remedial measures may have fair trial. The

warm bath, if convenient, or, what I prefer, large hot fomentations, and a moderate trial of the taxis, preceded by a large dose of opium—I prefer this to either chloroform or tobacco.

In the Medical Press, 1863, I published a case in which I was successful in reducing a badly incarcerated hernia, under the influence of opium, being the third case in which I had used it successfully. The following cases have also occurred in the course of my practice.

J. A., aged fifty-eight, a stone-mason, has had a right inguinal hernia for several years, for which he wears a truss, but, from the nature of his employment, lifting heavy weights, it sometimes protrudes. A year ago it became incarcerated, but, after a moderate dose of laudanum, was easily reduced. On this occasion, when lifting a heavy stone, the hernia came down, and he could not reduce it. Having been away from home most of the day, I found, on my return in the evening, that my assistant had been sent for three hours before, had tried the taxis, and, finding he could not reduce it, gave 25 drops of Battley's sedative. On visiting him I found the hernia about the size of a goose egg, and the patient suffering great pain. I tried the taxis again, patiently, for nearly an hour, when I made up my mind that the case would require operation. Not having had dinner, I gave him 40 drops more of Battley, and went to have some refreshment, and prepare the requisites for operating. On returning, after an hour, I again tried pressure, and had not the hernia five minutes in my hand when it returned easily, and all went well.

I was called about 3 a.m. to see J. F., aged twenty-five, delicate of frame and constitution. He had a left inguinal hernia, for which he habitually wore a truss by day, but left it off at night. On this occasion, during a fit of coughing, the hernia protruded, and, becoming painful, he sent for me. I found him in great agony; his pulse sharp and rapid; countenance anxious; the hernia had been down four hours, and felt tense; he had vomited once. I tried the taxis, got him into a hot bath, and there repeated the attempt to reduce it, but without making the slightest impression upon the swelling. I then determined to have recourse to the operation, and wrote to a friend to come and assist me; but as he could not reach me for four hours, I gave two grains of opium, and directed one to be taken every hour, keeping up a hot fomentation with flannels and impervious cloth. When my friend arrived, four grains of opium had been taken. He suggested chloroform; and I was about to leave the house to procure it, when the hernia receded under the slightest pressure of his hand. We applied his truss; his bowels responded to a dose of black draught, and he recovered rapidly.

Two years ago I was called at midnight to visit a small farmer, about four miles from my residence. He was aged seventy-five; wore a truss for an old inguinal hernia, which had come down on the previous evening, and not being able to reduce it, as he was used to do, it became painful; colicky pains set in, and he felt very ill. Having been apprised of the nature of the case, I brought my son, Dr. John Martin, with me, and the necessary articles for an operation. I found the man suffering greatly; the hernia of very large size; solid, as if containing omentum, and tender to the touch. I first threw in one-third of a grain of muriate of morphia under the skin, and tried the taxis, but without success. I then applied the ether spray, which produced great contraction of the skin and loose structures; but two hours passed without making any impression on the hernia. I then threw in half a grain of the morphia subcutaneously, and, waiting for half an hour, again tried the taxis, which was very speedily successful, and the patient made an excellent recovery.

A few years ago I was requested by a *confrère* to visit a patient in the Poorhouse Hospital under his care, on whom he mediated operating for the relief of an incarcerated hernia, but for which he was strongly advised by a mutual medical friend to try the opium treatment. I found the patient to be a wretched object, vomiting constantly; abdomen tumid, but not tense, and the hernia bore handling well, not being at all tender; still the taxis made no impression on it. Feeling satisfied that it was not strangulated, I, too, voted for the opium treatment, and he was ordered a grain every four hours, frequent enemata of warm milk and broth, and hot fomentations to abdomen and hernia. This line of treatment was continued for eleven or twelve days, when the hernia receded spontaneously; the bowels acted after having had no motion for fourteen days; and the patient recovered so rapidly that he left the house four or five days afterwards quite well.

What became of the eighty or ninety grains of opium he took? for he showed no sign of narcotism all through his illness.—*Dublin Journal of Medical Science, Nov.* 1874, *p.* 382.

ORGANS OF URINE AND GENERATION.

53.—CERTAIN DIFFICULTIES IN THE PERFORMANCE OF SYME'S PERINEAL SECTION.

By Edward Lund, Esq., Surgeon to the Manchester Royal Infirmary.

[It is often a matter of extreme difficulty to pass the catheter in the operation of perineal section, or to replace it a few days

afterwards. The operation should be confined almost entirely to cases of old undilatable stricture of the urethra, in which the tissues about the perineum are the seat of much chronic induration, with perineal, scrotal or penile fistulæ.]

When in our preliminary examination of these cases we detect albumen in the urine, it is often difficult to decide whether it is derived from muco-pus from the bladder, or has been secreted by temporary congestion of the kidneys, or whether it be indicative of positive structural change in these organs. I have for a long time taken as my guide in these cases the specific gravity of the urine, where it is possible to estimate it from the daily average, unless the presence of renal casts or oil-globules should give unfavourable indications, and before proceeding to operate I collect the whole secretion of twenty-four hours, and judge from it as to the specific gravity. If, together with the presence of albumen, there be a constantly low specific gravity, say, never reaching above 1·010, the patient not taking more than the average quantity of fluid per day, I should look with great suspicion on such a case, and feel very indisposed to proceed to operative interference. If, however, the albumen were in the same proportion in another case, but the average weight of the urine passed per diem was from 1·015 to 1·022, I should have no hesitation in dividing the stricture. It seems to me that the dangers we have to fear in diseases of the kidney, viewed in the light of surgical operations, arise not so much as might at first appear from debility consequent upon continued loss of albumen, as from the risk we run that, while the patient is suffering from the shock of a recent operation, the kidneys, influenced like all the other glands in the body, through the sympathetic system, suddenly cease to secrete from the blood those matters which they ought to eliminate in such proportion as must be compatible with life. For, in such cases, even before the operation, as proved by the low specific gravity of the urine, the quantity of matters secreted was at the minimum, and therefore these secreting powers being still further diminished, the kidneys fail to remove a quantity sufficient for the continuance of healthy function. For in such cases is it not the accumulation of urea in the blood more even than the sudden cessation of flow of urine which are the gravest of all symptoms with which we have to contend? And is it not then that we observe slowly yet surely creeping over our patient a confusion of intellect with that passive apathetic state which so quickly terminates in coma and in death? Thus, as I have already said, next to the structural change which necessitates an operation for division of the stricture, the amount of induration around the urethra, the numerous fistulæ, and the continued trouble pro-

duced by the abnormal passage of the urine—above all these things, we must consider the condition of the kidneys as determining whether or not the operation of perineal section should be performed.

In order to prepare the urethra for the passage of the director at the time of the operation, which it is essential should be accomplished in this form of perineal section, and when it is impossible, by reason of the smallness of the stricture or the presence of numerous false passages, to pass a fine bougie or catheter into the bladder, I have found it an admirable practice for a week or ten days previous to the operation to desist entirely from any such attempts, and to adopt the plan which, I believe, was advocated by the eminent surgeon who designed the operation I am discussing, viz., no longer to use a small instrument, but to proceed at once to dilate as fully as possible the whole of the urethra in front of the stricture, and there to establish a dilated condition of the passage similar to what we know must exist in the urethra behind the stricture by reason of the pressure of retained urine. I begin with as large a bougie as can be fairly passed along the passage, not being satisfied with less than No. 8 or 10—if possible a larger than this—and pass it each day down to the face of the stricture, holding it there for ten or fifteen minutes. If, after two or three such applications, it passes a greater distance as if the urethra were expanding on the anterior side of the stricture, I would then for the remaining few days use a still larger size. I believe this has a very beneficial effect; it so separates the sides of the passage as to draw the mucous membrane away from the strictured part of the canal and enlarge the little orifice, which must still be present at the end of the *cul-de-sac*, like a hole in the bottom of a cup. When the time arrives for the operation, and everything else has been prepared, it becomes the duty of the surgeon or his assistant, to introduce the Syme's grooved staff, in which it will be remembered one part is made extremely small, equal in the curved portion to a No. 2 or 3 catheter, the shaft of the director being equal to a No. 8 or 10. As soon as the instrument is brought down to the face of the stricture, with the urethra prepared by extreme dilatation, it is wonderful to notice how readily, in most cases, a urethra which ten days previously would not permit in any way the passage of a small catheter will now receive the narrow portion of the director, and we may slip it on through an indurated stricture into that wider portion of the canal which leads to the bladder.

It becomes necessary for either the surgeon or his assistant to introduce Syme's director; and here it is of the utmost importance that we should be quite certain that the point of this instrument really passes into the bladder; for only those

who have had experience in this procedure can bear testimony to the extreme difficulty, which sometimes arises, in being quite sure, whether or not, the director has taken the right course.

I believe although we may be satisfied that the point of the director is in the prostatic portion of the urethra, as we can prove by examination through the rectum, yet it may have travelled along some false passage in the prostate itself, which some previous catheterism has unfortunately produced, and having thus pierced the prostatic tissue its point may project up into the cavity of the bladder. The question thus arises, Will such a state of things be a bar to the progress of the operation? Although I am willing to admit it would be only in exceptional cases that we should overlook such a condition, from cases which I have seen, yet I know it is possible that the operation may be brought to a successful issue even though the beak of the director be in this abnormal position. The usual test, that the point of the instrument lies loose in the bladder, of course is, that, while we can only feel it per rectum through the dense tissue of the prostate, we can rotate it easily on its own axis from side to side, and so prove that the apex is free to move within the bladder. The most important thing to determine is that the point of the instrument, after passing through the membranous portion of the urethra, has not diverged either to one side or the other, or more likely backwards or downwards into the loose tissue between it and the prostate or the rectum. Here, of course, it would be appreciable to the touch of the finger when examined by the bowel, and in such a case on no account should we proceed with the operation. The only exception, therefore, which I have allowed to the rule that the operation is not to be proceeded with unless the point of the catheter moves freely in the bladder, is in those rare cases where, as I have just said, we have reason to think it has entered an old sinus in the prostatic portion and there become in some degree fixed. The instrument is now given into the hands of the assistant, to be held by him in somewhat the usual position of the staff in lithotomy (only placed so that the groove may point directly towards the operator, not in any way giving it a lateralised direction), and the operator has to satisfy himself that the curve of the director or the thick portion of its stem can be felt deeply in the middle line of the perineum. If there be much induration this will be impossible in many cases; and it is therefore imperative on the operator to proceed in a very cautious manner in his first incisions. My plan has always been, and I first learnt it from the late Mr. Dumville—who for many years enjoyed a well-earned reputation for the special performance of this operation, and no one whom I have seen accomplished it more rapidly or with better results—to

make my first incision from above downwards, exactly in the middle line of the perineum; not by plunging the knife into the perineum in front of the rectum, and then cutting forwards as some surgeons have recommended.

In the selection of the knife for this purpose I have found it is far easier to do it with a long narrow-bladed knife than with a broad one. The knife I always use is what is known as a finger knife, with a blade not much more than a quarter of an inch in width, and from two to two and a half inches in length. It is true that the cutting surface of such a blade is not needed for more than one inch from its point, and that its length may seem to be unnecessary, but the advantage of the long narrow blade is that, while it lies by the side of the index finger which guides it in the deeper portions of the incision, it does not conceal the view, whereas, with a shorter and wider one, of the ordinary scalpel form, the blade, as well as a portion of the handle, might be buried in the wound. It is generally needful to make more than one cut in the middle line, beginning about one inch and a quarter in front of the anus and continuing it backwards about an inch. As I proceed I seek, from time to time, for the director in its cylindrical or its grooved portion, and it is very important to take care that neither by habit, as in the operation for lithotomy, nor by mischance, we do not, when the moment arrives for opening the urethra, cut into it on the side, instead of on its front aspect exactly in the middle line. It is want of care here which I think often leads the operator to slip by the side of the small portion of the director, and thus to miss the true position of the groove. As soon as, guided by the nail of the left index finger, I can make out any portion of the groove, I follow the plan which Mr. Dumville so often referred to, viz., that while up to this time the knife has been used with its back upwards and towards the operator, and is still held in the groove in which we are sure it is fixed, by the inability to move it from side to side, it is now made to turn round upon its point until the edge of the blade points upwards, and then by carrying the handle well backwards (having taken care that the pelvis of the patient hangs well over the edge of the table), the point can be made to travel along the groove of the staff, and cut the urethra just at that part where the shoulder of the cylindrical portion can be felt. It is very often difficult to do this, but the difficulty, I think, depends upon the way in which the knife is held. It is not an easy thing to run the point of a knife such as I select, along the groove of the steel director of which we are now speaking. Whether or not it is because the knife blade is of hard steel and the groove in the director of softer metal, yet so it is, that they are very apt to stick or hang together if

we allow the point of the knife to impinge upon the surface of the groove at any thing like an obtuse angle. But the more nearly the blade of the knife is placed parallel to the groove in the staff so will it travel along with increased facility. Mr. Dumville used to boast that in this peculiar method of turning the knife round while the point rested in the groove he had broken the point of many scalpels, but he said that by this means he had rarely failed to retain the knife in the groove when he had once fairly entered it. Having in this way divided that small portion of the urethra which is close to the cylindrical portion of the director, we can generally tell, by the ease with which the director passes on, that we have overcome the obstruction, yet very often it will be needful to turn the knife again with its cutting edge towards the rectum and slowly to drive it along the groove.

Here, again, the great advantage of a narrow-bladed straight knife, having its back and cutting edge parallel to each other, will be apparent, for with it we can so nicely regulate the amount of tissue which we wish to divide; and holding the knife in the position described above, we can slide it along the groove and push it within the bladder, while from the narrowness of the knife-blade it cannot divide the prostate to any dangerous extent. At this stage of the operation, and as soon as the cylindrical portion of the director can be passed onwards, we can also pass the finger, if not quite into the bladder, at any rate into the dilatable prostatic portion of the urethra, and thus be quite sure that the entire passage is laid open. But there are cases in which we cannot do this, and it is difficult to explain why it should be so, except upon the supposition that the narrow portion of the director is held in the prostate. It now becomes necessary to follow some positive plan by which we may be sure that we can introduce the catheter into the bladder along the divided urethra. My method is this:—I have what I call a hollow probe, a small silver tube about six inches in length, to correspond in size with a No. 4 catheter, made at one extremity slightly bulbous, and at the other conical, so as to fit the mouth of a small india-rubber ball syringe, and provided at the time of its introduction with an ordinary silver wire stilette. I then take this hollow probe with its stilette, pass it by the perineal wound, and guide it either along the groove in the director, or by the side of it, until I believe it to be in the cavity of the bladder. But, to be quite sure of this, I remove the stilette, and if, as is generally the case, an ounce or so of urine has remained in the bladder, a small quantity of it can be forced through the hollow probe by pressure over the pubes, and this will demonstrate the true position of the instrument. If this should fail, I inject by the

probe two or three ounces of warm water, and then making pressure on the pubic region, the water will flow back in a continued stream through the tube. Having thus demonstrated to the satisfaction of myself and those who are assisting me that the probe is thus placed, I direct my assistant to remove the grooved director. I then take a silver director of rather a peculiar form, being about equal to one third of a cylinder, the diameter of which would correspond to a No. 15 catheter. This is provided at one end with a small handle about a square inch in extent, fixed to it at an angle of about 135°, and at the other end it is made perfectly smooth, but, unlike most directors, not at all spoon-shaped or lipped, being, as I have said, the section of a true cylinder. This instrument I can slide with the greatest ease by the side of the hollow probe, and pass it into the bladder without any difficulty, if in its passage it be held with its edges forwards and backwards. As soon as it has entered the bladder, and is turned round that its concavity may be directed forwards, it will dilate the wound and cause the expulsion of any remaining quantity of water or urine that may be still in the bladder. This will give another proof that the director also is within the bladder. I then remove the hollow probe, and leave the director in its place, with its concavity forwards; and now begins that stage of the operation which I think those who have many times performed this perineal section will admit is often a very troublesome one, that is, the introduction of the catheter into the bladder, where it is to be retained for forty-eight hours, or a longer period. For reasons which I will presently explain I no longer use for this purpose the ordinary elastic catheter. I employ what I have styled an urethral tube, made of the same material as the gum-elastic catheters, corresponding in size to a No. 10, ten inches in length, slightly conical at one end upon its exterior surface, and having six small holes in the first inch from that extremity. The way, or passage, through this urethral tube is perfectly straight and of equal bore throughout.

I have a wire from an ordinary gum-elastic catheter, No. 10 size, cut to such a length that when it is pushed as far through the urethral tube as the ring at one end will permit, it will project beyond it only a tenth of an inch or even less. I curve this wire in such a form as either to imitate the ordinary catheter curve, that of the prostatic curve, or the curve which is given by Sir Henry Thompson, to his No. 1 silver catheter, and I prepare to use one of these three curves, according to the requirement of the case, either by having three wires ready curved, on which I can place the urethral tube, or I curve each wire for the occasion. Having the urethral tube mounted on the wire which I have selected, the two are then in the usual w

held firmly in the right hand, and passed down the urethra until the finger introduced into the wound tells me that the tube has passed into the divided portion. I now take hold of the silver director, which has been in charge of the assistant, and with that curious harmony which we know exists in the co-ordinated movements of the two hands, there is no difficulty in slipping the end of the urethral tube into the grooved surface of the director and carrying it on into the cavity of the bladder. If any difficulty should arise it is generally caused, according to my experience, by the same fault that occasions a difficulty in the passage of the knife along the groove in the director, that is, the end of the tube strikes the groove in the directer too much at a right angle; it does not lie sufficiently parallel to the surface so as to slide along it, but it sticks upon it and will not move. This difficulty may be overcome either by using the urethral tube upon a wire stilette curved to a larger circle, which is the same as being more flat, or by tilting up the handle of the director, which is just outside the wound in the perineum, so as to cause the other end of the director to dip more deeply into the bladder and form a sort of sliding surface upon which the urethral tube can run. As soon as it is evident that the tube is in the bladder, which may be proved, if necessary, by removing the wire and injecting water along the tube, pressing the pubic region and causing the water to flow out in a good stream, I then, and not till then remove the director from the perineal wound.

Now, as to the best mode of fixing this urethral tube in the bladder. For this purpose I use a little screw catheter-holder such as is employed for holding elastic catheters, and so made that it will compress, by a screw action, a catheter of any size from 12 to 3, and with rings at the sides to which tapes can be attached. I take care to place this so far down the urethral tube that the tube may lie fairly within the cavity of the bladder. Then to keep it in the bladder, I adopt a plan for the general principle of which I am indebted to Professor Lister, who showed me while at Glasgow, many years ago, what he considered the best method for retaining a catheter in the bladder. It is this: to so arrange a system of tapes and narrow bandages around the pelvis that the catheter shall be tied to them and to the immovable pelvis as the patient lies in bed, rather than to either thigh, or to the penis, which may be constantly disturbed in position. I take a broad bandage measuring, say, five inches in width and two yards in length; from the lower border of this I tear up a narrow strip at each end, about three quarters of an inch in width, to within four inches of the middle of the bandage. Then, to prevent this narrow strip tearing away too far, I cut with a pair of scissors

a small hole in the bandage just above it, and pass the narrow strip through this, and once or twice over the edges of the bandage, thus fix it at that spot, so that it cannot slip. The bandage, thus torn, is then placed under the patient's body and tied round the abdomen just above the pelvis, uniting together the broad portions of the bandage. Then the narrow strips which hang down behind from each side of it are, it will be noticed, attached to the broad portion, at spots just eight inches apart, where they will lie on each side of the spine, under the patient. These are brought beneath the buttocks, on each side of the scrotum, and tied in the same way to the bandage through little holes in front just opposite to those behind, or still better, a little further apart, so that the narrow bandages in front will be at least ten inches interval. All these folds of the bandage are made just comfortably tight so as not to hurt the patient, and the object of having a fixed space between the small bandages in front and behind is to prevent them, as they are so apt to do, running together in the middle line just over the line of the wound, or the position of the anus. Then from the eyelets or rings of the catheter-holder strips of tape are taken and attached to the narrow bandage which runs up on each side to such a length as shall just allow a little play to the urethral tube in the urethra.

Lastly, to obviate the difficulty which most surgeons must have observed, of retaining a flexible catheter in the bladder where it is apt to curl downwards and in this way slip out, I have, as was also suggested to me by Professor Lister, followed his plan of taking a piece of the wire stilette of a No. 10 catheter, cutting it about four or five inches long, and introducing it into the urethral tube so as to keep that part of it stiff and straight. I convert the wire into a plug to stop the end of the urethral tube, by winding round it near to the ring a narrow piece of adhesive plaster into a conical form. This forms a plug which has to be removed each time the bladder is emptied, and it is not difficult to get a patient of ordinary intelligence to perform this operation for himself. I have lately substituted for this wire a piece of whalebone about nine inches in length, conical at one extremity, and this is to be kept in the tube in the same way as the wire, only, being pliable and elastic, it has this advantage over the wire, that it gives firmness to the whole length of the tube, whereas with the wire the tube beyond it often becomes bent and almost pierced by the point of the wire. All matters being thus arranged the patient may be pronounced in a fair position so far as accomplishment of the operation is concerned, but, as is well known, difficulties may occur long after the patient has left the operating theatre and is safe in bed. On the question of

hemorrhage I have not much to say; thus far I have had no difficulty with it, and I have only known of one case in which it has been excessive after this operation. If needful I should not hesitate to plug the wound around the urethral tube much in the same way as we do the tube in the bladder for lithotomy, but so far I have never had occasion to carry this into effect.

I have seen so much trouble and difficulty from following precisely Professor Syme's instructions to remove the catheter thus placed in the bladder after perineal section at the end of forty-eight hours, then to leave the patient to pass his urine as he can, and only introducing the catheter at intervals of two or three days:—I say, I have seen so much difficulty in this second introduction of the catheter that I have long since departed from the exact instructions of one for whose opinions in surgery I have so much respect, and I now adopt the following plan, by which it will be apparent why I use the peculiar form of urethral tube which I have already described. I leave the tube in the bladder just as I have fixed it for at least three days, or even longer if the flow of urine is free and there is every reason to be certain that the tube is rightly placed. Then, at the end of this time, perhaps five days from day of operation, for fear the holes at the sides of the tube should become obstructed by clots of blood and mucus or phosphates, I usually proceed to change the tube for a fresh one. This I do in the following manner: I have a long stilette made of whalebone carefully fashioned in its entire length of a size equivalent to a No. 2 catheter, of a cylindrical form, quite smooth, and rounded at each end. It is twenty-two inches in length, and at a spot ten and a half inches from each end I have a mark made on it, either as a little groove carefully filed in it or still better a small white mark produced by fixing in the whalebone a fine plug of ivory. Unscrewing the holder by which the urethral tube is retained in the bladder, and cutting the small tapes which hold it, so that it can be removed entirely, but taking care that the tube is not displaced until all is ready, and standing on the right side of the patient, I hold the urethral tube firmly with the left hand. I then have the whalebone stilette well oiled, and pass it down the urethral tube, which it will be remembered is ten inches in length, till so much of the stilette has entered the tube as to bring it up to the mark, which is ten and a half inches from its end. Unless the urethral tube has become acutely bent in some part, and this can easily be done, I know that one half inch of the whalebone stilette will project beyond the end of the urethral tube, free in the bladder. With the right hand holding the whalebone stilette steadily some few inches beyond the urethral tube, and the

right elbow resting firmly on the patient's right thigh, I draw, with my left hand, the urethral tube out of the urethra and slide it along the stilette until it is clearly disengaged; my right hand all the while keeping the end of the whalebone stilette still in the cavity of the bladder. Then, as soon as the other end of the urethral tube has emerged fairly from the urethra I seize the stilette close to the glans penis, and hold it there with the left hand; my assistant draws the old urethral tube away, and in its place puts a fresh tube, which should be softened with warm water to make it perfectly pliable, and well greased. This, in its turn, will slide down the whalebone guide, and the right hand once more taking hold of the stilette, so as to be sure that it is kept steadily within the bladder.

It is easy to understand how this second tube can be slid down without any risk of its showing itself in the perineal wound or failing to reach the bladder, and on the reappearance of the little ivory mark on the whalebone stilette we know that the urethral tube has got fairly beyond the end which is in the bladder. This is then fixed in the same way by the screw catheter-holder, tapes, &c. I repeat this process as often as I deem it needful to put in a new urethral tube, and, in some cases, I have kept the tubes in for several weeks in succession, changing them every four or five days as might be required, and thus secured a perfect healing of sinuses which had been the cause of all the trouble, and this without any of those risks, in failing to introduce the instrument, which I seek by this method to avoid. In spite of all my care it has on more than one occasion happened to me that about the second or third day after the operation the patient has got the urethral tube out of the bladder. One patient, an old man, deliberately untied the tapes and thought himself very clever in performing this facile operation without instructions.

Even up to so late a period as the tenth day after the operation I have succeeded in replacing the tube in the bladder by exactly the same process as was used in the first instance, and although at this time the wound in the perineum would seem to be very nearly healed, yet the patient being under chloroform, in the lithotomy position and everything else prepared, I found no difficulty in passing through the wound, which seemed to have become merely a sinus, the hollow probe into the bladder, verifying this by a careful examination through the rectum and by the crucial test of injecting water along it, waiting for a moment, pressing over the pubes, and having it returned in a good stream through the tube. This fact being established to the satisfaction of those who assisted me I could slide by the side of the probe the silver

director, which has no lip or projecting edge at its end, to prevent it passing readily, and therefore travels along the incision like a blunted scalpel, reopens the wound, and turning it half round so as to have its concavity upwards, I could pass the urethral tube on the curved wire stilette, so as to bear upon the director and thus slide it into the bladder with the greatest ease, and from that day, in the case just referred to, as well as in other cases, no further difficulties were experienced. Whereas, on the contrary, I have known in cases of Syme's perineal section that the surgeon has been compelled at last to desist from any further attempts to pass the catheter where it has unfortunately slipped out, or had been removed by reason of having no guide for its reintroduction which can compete in simplicity and certainty with this plan of sliding the tubes along the whalebone probe. After three or four weeks or even earlier, when the sinuses which have preceded the operation have ceased to discharge or are entirely healed, then the urethral tubes can be discontinued, and a catheter passed from time to time in the ordinary way. If the perineal section of Professor Syme be reserved for those cases, and those only, of chronic indurated urethral stricture with sinuses and with an almost impervious passage, the great advantage to be gained by the successful issue of such cases will, I think, more than compensate for the risks which it may be assumed are inseparably connected with this operation; but which, I think, may be much diminished in intensity by following out the system of operating and the details of treatment which I have ventured to particularise in the foregoing remarks.—*Liverpool and Manchester Medical and Surgical Reports*, 1875, *p.* 109.

54.—ON THE TREATMENT OF ORGANIC STRICTURE OF THE URETHRA.

By Thomas Annandale, Esq., F.R.S.E., Surgeon to the Edinburgh Infirmary.

[In a previous part of this paper the writer describes the symptoms and diagnosis of stricture of the urethra. We give his observations upon the treatment of the disease.]

I will consider the following three varieties of this condition: 1. Simple uncomplicated organic stricture; 2. Organic stricture with constantly recurring spasm or contraction; 3. Organic stricture complicated with—(*a*) retention of urine, unrelievable by the catheter; (*b*) obliteration of the urethra; (*c*) urinary infiltration, abscess, or fistulæ; (*d*) calculus in the urethra or bladder. There being no known certain and permanent cure of an organic stricture of the urethra, we must endeavour to

use those methods of treatment which afford relief for the longest period, and which have been proved to be the safest in their application. As a most important assistance in any operative treatment, it is essential that the patient's general health be carefully attended to, and especially that the state of the kidneys and urine be investigated, and any abnormal condition, if possible, remedied.

A troublesome symptom in connexion with the treatment of this disease is the occurrence of rigors in some instances after the slightest interference, such as the passing of a bougie or catheter. The administration of quinine I have found very valuable in checking this symptom; and by giving five or ten grains of this drug two or three hours before the instrument is used, the rigor will often be prevented altogether or much modified. If the rigor does occur, a second dose of the quinine will certainly relieve it or lessen its intensity.

Let us now consider what treatment is most beneficial in the *first* variety I have mentioned. Gradual dilatation, such as is accomplished by the passing of bougies at regular intervals, is, in my opinion, the most satisfactory method of treating uncomplicated organic stricture, as regards both its safety and the duration of the relief which it affords.

In carrying out this method, I must express my strong conviction that the employment of metal bougies is to be preferred to instruments of a softer material. This point is a disputed one, for some eminent authorities advocate the use of the softer instruments; but my own experience is in favour of the metal bougie, care being always taken to use this latter instrument gently, and with the remembrance that such an instrument will, if roughly or improperly handled, do much injury. In carrying out gradual dilatation, the instruments should be passed at intervals of two, three, or four days, according to the amount of irritation which follows the proceeding; and it is often a useful assistance to have the bowels opened by some mild laxative or enema on the morning of the operation. In treating very tight strictures it is best to employ in the first instance a small catheter in preference to a bougie; and if there is any difficulty in introducing the instrument it should be tied in for twenty-four or forty-eight hours, and the dilatation with bougies commenced the day following its removal.

Holt's, Thompson's, and the other methods of immediate dilatation or rupturing the strictured urethra or structures surrounding it (the instruments for which you see here) may be employed in this class of stricture; but my experience is that recontraction follows all these methods much sooner than when the gradual dilatation is employed; and that therefore, unless it is of consequence that the stricture should be quickly dilated,

it is better to take a little more time and cure the condition more effectively by means of the bougies.

The *second* class of organic stricture is one always most troublesome to the surgeon. Gradual dilatation has only a very temporary effect in cases of this kind; and if this treatment and a careful attention to the general condition fail to relieve the patient, I have no hesitation in strongly recommending the operation of internal division, as I have found it the most efficient in relieving this form of stricture. The instrument which I have used for the last five years is the one which I show you. I obtained it from New York, and you will find it figured in Dr. Gouley's recent work on this subject. This instrument is, in my opinion, the best which has yet been suggested, and the results obtained with it have given me the greatest satisfaction.

After the stricture has been incised, the urine should be drawn off regularly twice a day with a No. 10 or 12 catheter for the first three or four days, and after this a No. 10 bougie should be passed at least once a week for two months. Holt's or Thompson's instrument may be used to forcibly stretch this class of stricture, but my observations have taught me to prefer internal division because it gives more decided and lasting relief.

The *third* class of strictures is most effectually treated by the operation of external division; for it is only in this way that many of the complications can be got rid of. If the complication is not excessive, as in the case of a fistula without much thickening of the surrounding textures, gradual dilatation should be first tried, and may prove successful; but in all cases where the complication is a serious one, or when other methods have failed, external division is a most valuable and successful method of treatment, and should be employed if the patient's condition admits of an operation.

The staff suggested by the late Mr. Syme is a most useful instrument in experienced hands, but there are cases in which this instrument cannot be used satisfactorily. For instance, when a portion of the urethra is obliterated, or when there are numerous false passages, this instrument is useless; and a much more successful proceeding is to introduce a full-sized bougie or catheter, and, having passed its point down to the stricture, to open the urethra immediately anterior to it, expose the strictured part, and divide it on a director or by passing the knife on in the direction of the urethra. After the operation a No. 10 silver or elastic catheter should be fastened in the bladder, and retained there for three days. After the withdrawal of the catheter a No. 10 bougie should be passed regularly twice a week until the wound is healed, and for at

least two months longer. If the complication depends upon the presence of a calculus in the urethra, this operation will admit of its being removed; and if the stone is lodged in the bladder, and not of very large size, it can also be removed by carrying the incision backwards through the membranous part of the urethra.—*Medical Times and Gazette, December* 12, 1874, *p.* 653.

55.—PROFESSOR DOLBEAU'S OPERATION FOR STONE IN THE BLADDER.

By Dr. William Ewart.

Little notice has hitherto been taken in this country of a new operation for stone which has been practised with good results in Paris for the last ten years, and is slowly gaining ground, not in France only, but across the Atlantic. Having lately witnessed it at the Hôpital Beaujon, I thought that an account of what I had seen would prove of interest. This operation is, in reality, a revival of the old Marian method, with the novelty that Mariano Santo's ideal, never realised by himself nor by his followers, has now been carried into practice. "A small incision, much dilatation," was his precept; but in the days of the apparatus major, though the wound was small, the dilatation was faulty, being together incomplete and excessive, acting in one direction only, and with violence. These defects are absent from Professor Dolbeau's operation. He has devised the means of forming by simple equable compression of the tissues the passage that formerly resulted from their laceration. But the neck of the bladder, even dilated to its extreme limits, will not afford room for the extraction of any but the smallest calculi. Hence the necessity of crushing previous to removing the stone, and the name of "perineal lithotrity" given to the operation.

The instruments used are few: a scalpel, a screw dilator, a crushing forceps, and various-sized seizing forceps. The essential feature in the screw dilator is that the blades keep parallel in every stage of their expansion, forming together a cylindrical body, the diameter of which varies with the action of the screw. At rest, the six smooth blades or columns are in apposition, and run up to a common point. They conceal two balls capable of moving up and down along a central stem, and of separating the columns more or less without causing them to diverge. The expanding portion of the instrument measures 8 centimeters in length, 1·2 c. in its smallest diameter, and 2 c. in its largest; the limit of distensibility of the neck corresponding to a diameter of 2·4 c., according to Professor Dolbeau's experiments. The forceps are intended to break, not to crush,

the stone, and for that reason are called "cassepierre." They possess great power, and their ingenious construction enables them to be opened, after their insertion through the wound, without any divergence of their limbs taking place in the thickness of the perineum. A good description of these two instruments is to be found in Professor Dolbeau's book "La Lithotritie Périnéale."

The patient is placed in the usual lithotomy position. The lower limbs are entrusted to two assistants; a third (whose office is responsible) taking charge of the strongly bent and deeply grooved staff: his duty is to keep it strictly in the middle line, to make its curve project in the perineum, and later to resist the pressure of the point of the dilator. The incision, two centimeters in length, is made with the blade upwards, and begins immediately in front of the anus, at the brown zone marking the passage of skin into mucous membrane. A deeper incision opens up the perineal fascia, through which the knife, guided by the left index-finger, is thrust into the membranous portion of the urethra. The work of dilatation now begins, and from the amount of care with which it is accomplished depends in a great measure the success of the operation. Four successive dilatations are employed by Professor Dolbeau. The first stretches the external aperture and the subcutaneous tissues. The instrument is next closed, and passed up to the groove of the staff and firmly pressed against it whilst the expanding screw is being turned—a proceeding that causes the whole of the membranous portion to slit up along the line of incision. The instrument can now be pushed one step further along the staff, which the assistant slightly depresses. As soon as the membranous region has sufficiently yielded to this third dilatation, the dilator is closed and pushed onwards into the neck of the bladder, the staff is withdrawn and the screw cautiously turned until expansion is complete. The passage thus formed is of uniform calibre, and has smooth walls. This can be felt by the finger in the dead subject. In the living Professor Dolbeau deprecates the use of digital examination. The stone is now within easy reach, and if very small will be removed by the light forceps used in making the first exploration after removal of the dilator; generally, however, it has to be broken up by the cassepierre. This is introduced without any great difficulty, and, thanks to the broad blunt beak in which it terminates, it obtains an easy grip even of the harder and smoother concretions. Large stones cannot be clasped, but will usually yield to the repeated bites of the instrument. The fragmentation of the stone is often very great; and to extract everything, even with the help of injections, is a task requiring much patience. Before the patint is released

from the lithotomy posture, a catheter is always introduced through the natural channel to obtain a crucial proof of the bladder having been cleared.

The after-treatment is simple: the obvious indications are rest and apposition of the thighs, with partial flexion of the thighs and legs. A sponge placed in front of the small perineal slit generally suffices to collect the discharge. The urine is drawn twice a day. It ceases to drop through the wound after a very few hours, and the opposite condition of retention from spasm of the neck is not uncommon. In the majority of cases twelve to sixteen days suffice to close the wound perfectly. In a few union has taken place by the first intention. If we look at the tabulated results of the operation, we find nothing very different from the returns of most lithotomists: one death in six cases. But it is contended that in Professor Dolbeau's practice the subjects were unusually unfavourable. For the first few years after its introduction perineal lithotrity was only tried where no success was expected of the ordinary means of treatment, and among the deaths that followed many were clearly inevitable.

Professor Dolbeau brings forward some strong arguments in favour of perineal lithotrity. The loss of blood is trifling, and seldom exceeds two or three teaspoonfuls; the wound is minute —two important considerations in dealing with old age and albuminuria. The bulb is out of the way of danger, and the rectum is not seriously imperilled. The grave surgical complications of pyæmia and of urinary infiltration have been hitherto unknown in Professor Dolbeau's practice. In none of his cases did the prostate resent the pressure to which its tissues had been subjected; and the neck of the bladder always escaped rupture or overstretching of its fibres. One of the most important elements of success in Professor Dolbeau's treatment is certainly the fact that patients are generally enabled to leave their bed soon after the operation, often as early as the second or third day.

But there are two objections affecting the operation itself, which must be weighed against its encouraging results. Perineal lithotrity is a long operation—it must be conducted slowly to be safe; and the prolongation of anæsthesia, however great a convenience for the operator, is certainly an additional chance against the patient. There is yet a graver objection—namely, the great difficulty of the operation. It requires to be studied in all its details, and practised repeatedly for itself, before it can be safely attempted. Not only must the surgeon possess skill and experience, he requires the services of a competent assistant. However, it suffices to witness Professor Dolbeau at work, ably seconded by Dr. Félizet, to see that the art can be mastered, and made to look simple.

Professor Dolbeau is a thorough believer in his method. He thinks it will ultimately replace lithotomy. He has certainly shown it to be better suited than any other to a few difficult cases. Whether this sphere of usefulness is to be extended indefinitely, time must decide; but viewed only as a successful variety of existing operations for the cure of stone, perineal lithotrity deserves to become more widely known, and to be put to a more extensive trial.—*Lancet*, *Oct.* 17, 1874, *p.* 548.

56.—ON OPERATINE MEANS FOR THE RELIEF OF PATIENTS SUFFERING WITH ADVANCED PROSTATIC DISEASE.

By Sir Henry Thompson, Surgeon Extraordinary to H.M. the King of the Belgians; Surgeon to University College Hospital, &c.

Very many individuals between fifty-five and sixty years of age begin to be unable to expel entirely the contents of the bladder. The act of micturition is more frequently performed, and requires some effort; the stream grows feeble, and, under the influence of external cold, or of some diuretic action distending the bladder, or other cause, it often happens that complete or nearly complete retention is established, In such a case the bladder is generally not emptied at any act in the most favourable circumstances; and if, immediately after an attempt to do so, a catheter be passed a notable quantity, say from three or four to twenty ounces, will be left behind, and is drawn off by the instrument. Consequently the patient is taught to use the catheter, and does so periodically, say twice three times, or more frequently, according to his necessity, in the twenty-four hours. As the patient increases in age the bladder often requires relief six, seven, or eight times per diem —a number by no means uncommon.

But in some cases, which happily are only exceptional, a more advanced stage arrives, by gradual steps, associated with a greatly diminished capacity of the bladder, so that the use of the catheter becomes necessary from sixteen to twenty-four times or more, in the twenty-four hours—a condition of extreme misery for the patient, inasmuch as it entails loss of rest, fatigue, and often also increased difficulty in passing the instrument from injury to the urethra by frequent catheterism. At this period, too, the augmented volume of the prostate sometimes makes the canal difficult to traverse alike for the patient and the surgeon; and if a false passage be made by either at this crisis, a fatal result almost of necessity follows.

A patient in these circumstances, then, exists for little else than to pass his catheter. No sooner has he obtained a half-hour's relief than he begins to feel the warning of another approaching call, and on each occasion he experiences some minutes at least of suffering in his endeavour to sustain as lengthened an interval as possible. His powers are tasked to the utmost, for continuous sleep is out of the question, and health rapidly declines. This hourly recurring task and the brief interval of rest which fall to the lot of such patients is a test of endurance of the severest kind. I have often been reminded that theirs is very much the same condition as that which exists as one of the chief athletic feats—first accomplished by the famous Captain Barclay, and often repeated since—that of walking 1000 several miles in 1000 consecutive hours, a task of no small magnitude; but with this wide difference—viz., that in the latter case the subject was in good health and training, knew the limits of his task, and expected a reward, whereas the patient is aged and infirm, and has small grounnd for hope as to the future of his trial. Indeed, "the odds" are largely against the latter in the struggle, and without a very decided change in his condition, he must lose miserably, and with inexpressible suffering, his "race against time."

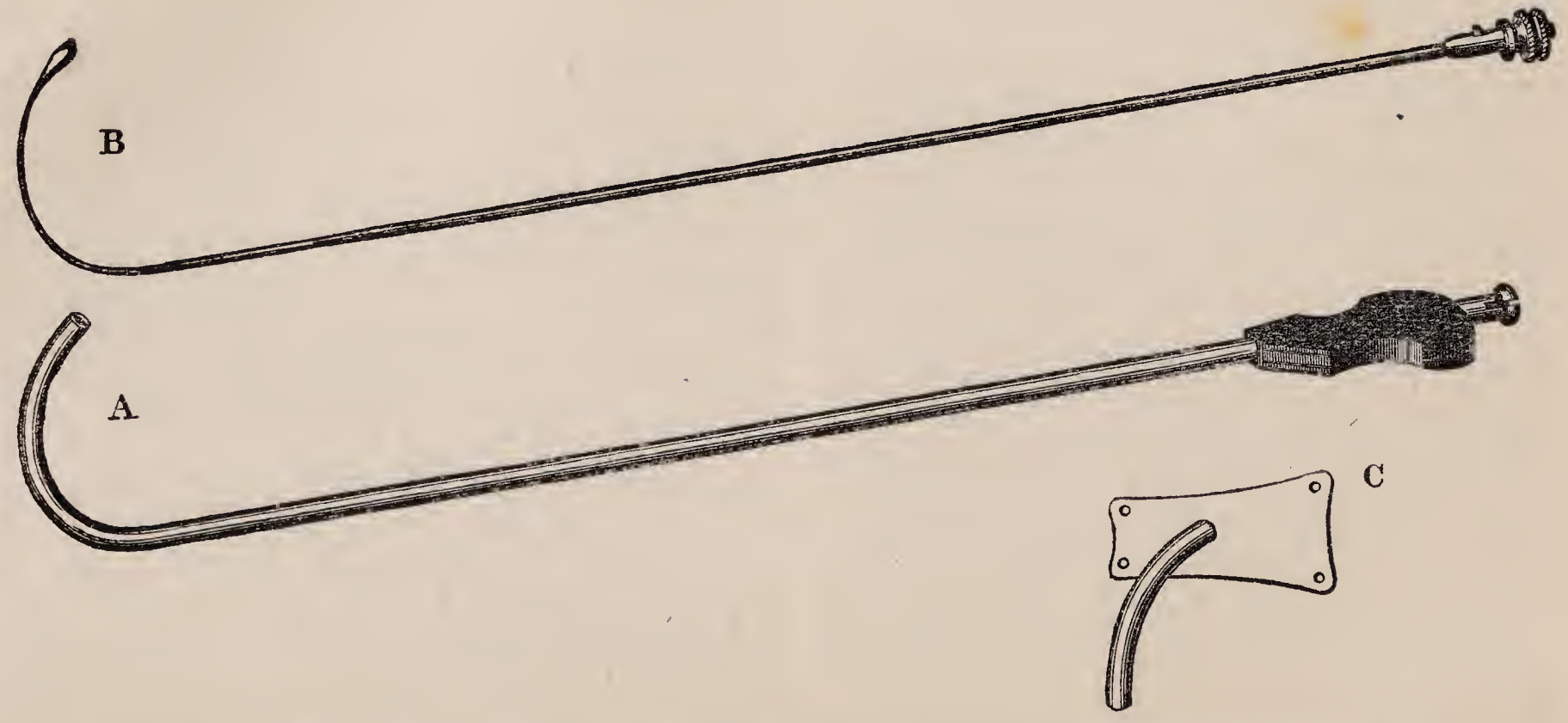
The arrival of this stage, then, is the almost certain prelude of death to the patient. Hence I have naturally asked myself, having seen not a few of these cases, "Can nothing be done, by any operative measures, for their permanent relief?" And I think it will be admitted that, if these should be somewhat difficult or even be attended with some risk, the gravity of the situation warrants an attempt, if only a moderate chance of affording relief appears to be attainable. I say "permanent relief," because a temporary remedy exists for some in the employment of an in-lying catheter. To tie in an elastic or india-rubber catheter is an expedient which may avert the fatal result a little; but it can be only temporary, and it may even aggravate the malady and hasten the end. I assume also that medicinal agents, including especially opium, have ceased to suffice for the exigencies of the case. The bladder is, indeed, so organically thickened and diminished in capacity that hourly relief has become a *physical* necessity.

I propose, then, in these circumstances a proceeding similar to that which we employ in the trachea when death is imminent for want of air—viz., the introduction of a tube beyond the seat of obstruction—one which is to be permanently retained there as the constant channel for urine, just as the tracheotomy tube has been for many a patient the only channel during years for air to the lungs. In other words, I propose to puncture the

bladder above, or rather behind the pubes. The proceeding which I have practised differs from ordinary puncture, and more resembles the high operation for stone, being rather a compound of the two. For, in the cases described, it must be remembered that the bladder is by no means distended with fluid, but may and must be nearly empty—a widely different condition, as regards operation, from the ordinary puncture. Moreover, the viscus is usually altered in position and largely deformed by masses of prostatic growth rising into its cavity, and sometimes even nearly filling the pelvis. I believe that puncture has never been done or recommended with this end in view—viz., to avert death by establishing a *permanent* outlet for urine when the urethra is no longer practicable through disease of the prostate and bladder. I do not overlook some interesting examples of retention of urine from stricture which were relieved by suprapubic puncture by my friend Mr. Thomas Paget of Leicester, and in which the tube subsequently became for years the permanent channel by which all urine passed. These operations, however, were not performed with that end in view, nor were they for prostatic retention all; but it was the comfortable condition of these patients, whom I saw, which led me to think of the analogous proceeding which I now desire to put on its trial.

The operation, which I have now performed three times, consists in passing a large sound, hollow throughout, with a strongly marked curve; that represented at A in the adjoining figure I have found as good as any, but it may be modified somewhat, according to the case, and closed by a bulbous-ended stylet (B). The instrument is introduced by the urethra until the end can be felt just behind the symphysis pubis. It is then confided to an assistant to retain in its place. The operator now makes an incision not more than three-quarters of an inch in length, less if the patient is not stout, enough to admit the index finger tightly (since a large opening becomes embarrassing subsequently), in the median line at the upper margin of the symphysis. The tissues are separated by the finger, and the linea alba being next slightly divided by the point of a bistoury, the finger is passed down closely behind the symphysis, and when the end of the sound is clearly felt, a little opening is made so as to expose its point. The operator now, taking the handle of the sound in his left hand, makes the end protrude in the wound, the bulbous stylet is withdrawn, and he passes the tube C in its whole length into the hollow channel of the sound. He now withdraws this completely by the urethra, and in doing so necessarily ensures the passage of the elastic tube into the bladder.

When I first designed this proceeding I used a sound with a



A, Hollow sound, the end of which, when stopped with the stylet (B), forms the point which guides the operator in finding the bladder in the last incision. Size about 12 or 13.
B, Bulbous-ended flexible metal stylet.
C, Suprapubic tube of elastic gum about 2½ in. long, with silver plate, introduced in its whole length into the sound when the stylet is removed. The withdrawal of the sound leaves the tube in the bladder.

second stylet having a sharp trocar at the end to take the place of the first, intending to make the incision for the tube by merely pushing the trocar from within the bladder outwards to the skin, after which the tube would be inserted and lodged in its place by withdrawal as above. I learned, however, by several experiments on the dead body that although this was safe and easy of performance in a distended bladder, the peritoneum was usually wounded when the bladder was empty. Hence my abandonment of what seemed a very simple and easy proceeding. The path of safety therefore is to make a very small opening directly above the symphysis, then to find the way close behind it to the end of the sound there, and incise only just enough to allow this to be pushed up into view. The insertion of the tube into the hollow of the sound, and the withdrawal of the latter, as already stated, brings the tube into its place. But it may be remarked that the urine may not at first flow through it, for the withdrawal of the sound may carry the tube, not only into the bladder, but, when this is empty or very contracted, even through it into the prostatic urethra. If so, the tube has only to be withdrawn a little and the urine flows. Indeed I have found that the tube is usually improved, especially in the subsequent progress of the case, by being a little shortened. It is then to be fastened securely with tapes and plaster, and to be worn a few days in bed until the parts are consolidated, and the patient can move about with safety. If the tube escapes during the first two or three days it may not be easy to replace it, but when the passage is established it may be removed and replaced easily enough. A very important injunction is to make the wound as small as possible so as to be nearly filled by the tube. A large wound is more painful, and is constantly traversed by the urine.

I will now briefly sketch the three cases in which I have done this, and give you the results.

The first patient was a man sixty-three years of age, admitted into this hospital January, 1869. He had for several years passed all his water by catheter, and for a long period had done so every hour and a half day and night, sometimes oftener. Examination by rectum showed the existence of a large prostate, the coats of the bladder were thickened, the urine charged with inflammatory products. He remained three months, and, notwithstanding rest and treatment, but slightly improved. It was evident that his troubles were not due to temporary irritation, but to organic changes greatly diminishing the capacity of his bladder as a reservoir. I need hardly enlarge on the importance of carefully drawing this distinction. Having explained to him fully ir

presence of the class the nature of his case and the design of my operation, he gladly accepted my proposal that I should do my best to relieve him. The operation was easily performed on the 12th of May, in the manner described, with immediate relief to the patient. Unluckily, on the third or fourth night the tube escaped, and the house-surgeon was unable to introduce it. The urine issued freely by the wound. The next day, at my visit, it was but too obvious that the walls of the new passage had not been yet sufficiently consolidated to protect the surrounding parts, and that extravasation had taken place into the scrotum. I at once made free incisions and tied in a catheter. It was a severe trial for the patient, but he came triumphantly out of it. The following six weeks, however, were occupied with this unfortunate accident and its results; meantime I had at an early period, and without difficulty, put the tube in its place and made it fast there by tapes and plaster. A week or two after the route was established and the tube was removed, washed, and replaced with the greatest ease every day. During the summer his health continued feeble; no catheter was necessary, the urine passing by the tube, but from insufficient attention to changing and cleaning it, phosphatic deposit formed on it, and gave much trouble. I lost sight of him in July, and he gradually failed in strength, and died in September.

The second case was that of an old and well-known medical friend, on whom in 1867 and in 1869 I had successfully operated by lithotrity. For a long period he had passed all his urine by instrument; he was now upwards of seventy-five, and had, after many years of trouble, arrived at the latest stage of frequent and painful catheterism. I was called to him in January, 1870, suffering from such extreme sensibility that he dreaded passing the catheter, which was necessary twelve times in the day and night. He was clearly approaching his end, and I agreed to perform this operation solely with the view of making his last days more comfortable. Mr. Clover gave him chloroform, and I did it on Feb. 7th. All went well; he never required the catheter again; he kept his bed, was comparatively free from suffering, and died three weeks afterwards.

The third case was probably seen by some of you here last spring. E. P., aged fifty, was admitted to this hospital April 22nd, 1874, having suffered from severe symptoms four years, the last two and a half of which he has withdrawn all his urine by catheter. Of late his sufferings have been great; his catheter is passed every half hour in the day, and he sometimes retains one for a part of the night. The prostate was "hard, nodulated, and enlarged"—a condition of very bad augury, occurring as it did before the age at which hypertrophy

of the prostate appears. On May 7th I performed the operation described, with the view of diminishing his pains and affording him rest. It was followed by relief, especially after the first day or two, and he gained long periods of sleep, which he had not had for months before. Nine or ten days after the operation he showed signs of failing strength, and he sank on the 21st inst. The autopsy showed cancer of the prostate and adjacent part of the bladder, of the scirrhus kind—the only case I have ever seen. The iliac glands, those about the base of the lungs, and the lungs themselves, showed the presence of the same deposit to a considerable extent. The only other authentic case on record is that reported by Mr. John Adams. The word "scirrhus," it should be remembered, has been often erroneously used, particularly by ancient authors, to denote organs which are enlarged by hypertrophy.

I have thus put the bare facts before you relative to these three cases. Little need exists for remark. In two of them, the second and third, the operation was adopted solely as a last resource, to mitigate the sufferings of patients whose fate was already sealed. In the first I operated at a somewhat earlier period, with the view of prolonging and rendering more comfortable a possible year or two of life. The unfortunate accident of extravasation was too great a demand upon the resources of the patient, and, although he recovered, yet his stock of vitality was largely exhausted. We must recollect that it was the first experience, and I gathered from it useful lessons. I made the opening much smaller afterwards, took redoubled care to retain the tube at first, and subsequently I should in such a case remove and wash it daily. The operation itself, properly performed, makes little or no demand on the patient's powers. I have no doubt I shall give it further trials. Thus prepared by past experience I have faith in its utility for appropriate cases.—*Lancet, Jan.* 2, 1875, *p.* 3.

57.—CALCULOUS DISEASE OF THE KIDNEYS.—CALCULOUS PYELITIS.

By Dr. W. R. Basham, Senior Physician to the Westminster Hospital.

Calculous disease of the kidneys is the major result of lithuria. The previous existence of a lithuric state, with more or less evidence of lithuria, is the invariable and necessary origin of calculous disease. In many this antecedent or precursory stage is overlooked—just as the premonitory symptoms of gout may be overlooked or unnoticed; for gout is the very essence of lithuria. It is the precipitation in certain tissues, chiefly fibrous and cartilaginous, of the lithic acid in combination with soda.

So in calculous disease, the lithic acid precipitated, in the absence of its alkaline solvents, from the blood, either as an oxalurate, and then combined with lime as an oxalate, or as pure lithic acid in amorphous masses or in crystalline grains, is detained in the renal tubes, from whence it may be washed out with symptoms of nephralgia, or still retained, slowly increasing by the accretion of similar particles, and at length setting up a group of symptoms which in their aggregate constitute the indication of calculous disease. The most characteristic starting-point in these cases is slight and perhaps scarcely, except by microscopic aid, appreciable, hæmaturia. In some the hæmaturia is palpable and startling the patient with alarm; in others, the presence of blood may only be suspected by the observant eye, and this well-formed suspicion only verified by microscopic examination. The state of kidney which gives rise to these attacks of hæmaturia is certainly not of an inflammatory character. There is no constitutional disturbance. The attack is mostly unexpected, occurring in many cases, without any warning, oftentimes apparently induced by some bodily effort. Horse exercise, or similar jarring physical acts, a jump, the jolting of a carriage over rough ground, have severally been referred to as the apparent exciting cause. It has been already stated that nephralgia, lumbar pain, frequency of micturition, and the occasional presence of crystalline grains of lithic acid in the urine, may indicate a disposition to calculous disease; but it is not till one or more attacks of hæmaturia have occurred that the proof is reached of a stone or gravelly matter being lodged in the kidney. Further proof may now be found in the occurrence of specific sympathetic sensations in certain nerves intimately associated or connected with the renal plexus of nerves; aching pain in the crest of the ilium; pains across the loins of a character similar to lumbago, only that in the latter disorder the pain is excited chiefly by motion, or muscular effort necessary for change of position, while the lumbar pain in renal calculus is unaffected by motion, and is dull and continuous when it is present. The external crural cutaneous nerve of the thigh often exhibits special alteration in relation to cutaneous sensibility: ordinary sensation is exchanged for singular errors of sense—not confined, however, to the limits of the distribution of the fibrils of this last-named nerve, but occurring in other parts of the skin surface of the lower extremities.

The explanation of the attacks of hæmaturia may be offered as follows:—Post-mortem examinations have demonstrated that not unfrequently there may be lodged in the straight tubes of the cones deposits of lithates, or even crystalline particles of lithic acid, or crystals of oxalate of lime. They are seen

as marking a distinct and visible deposit in one or more of the tubes when a section is made through one of the mammillary cones. They give a streaked appearance to the cone, the tubes blocked by these matters looking pale or even resplendent against the light. The nature of this deposit has been determined by analysis, as well as by the microscope. In many instances, doubtless, this deposit is only temporarily a cause of irritation. It is driven forward by the urinary current and washed out by the urinary stream, and, as sand and gravel, appears as a sediment in the voided urine. In other cases, however, if carried out of the renal tubes, the material may be detained or lodged in some recess of the calyces, and then by slow accretion increases in size; and, according to its composition or by the nature of the succeeding layers added to its surface, remains and forms as it were a home for itself, becomes perhaps encysted, and is lodged permanently within the sulcus of the kidney: or, if it escapes into the infundibulum it may pass down the ureter, accompanied by marked and most characteristic symptoms, into the bladder, from whence it may be voided through the urethra, and thus happily terminate in a spontaneous relief. This favourable result happens only when the calculus has not exceeded a certain size, and when its composition is either oxalate of lime or lithic acid, or the former constituting a minute nucleus, with concentric layers of lithic acid superimposed. Such a calculus, to bring it within the probability of spontaneous escape, rarely exceeds in size a small pea. In women such calculi may become as large as a lentil or small haricot bean, and yet obtain their escape through the larger capacity of the female urethra. The writer has in his collection two that are of the size of a small white haricot bean, passed at intervals of many months, from a female patient.

In all similar cases there is one clinical fact that should not be overlooked, and which may account for the escape of some calculi and the hopeless retention of others. So long as the irritation set up by these calculi is little more than simply hyperæmic, relieved by the escape of blood occasionally, and the urine is charged with mucous exudation corpuscles only in a very moderate degree, and if the lithates in the urine are absent or very scanty, the calculus will increase by the addition of fresh layers of pure lithic acid, the growth will be slow, and the surface remain smooth,—a condition essential to a spontaneous escape. But let the urine be loaded with lithates, let the irritation excite a blennorrhagia of the mucous surfaces of the calcyes, and such an amount of mucus is excreted that at first lithates are rapidly deposited on the surface of the renal calculus; its growth is thus accelerated; and further,

this abundance of organic material excites molecular change in the urine passing over the calculus, and now in addition to to layers of lithates, external with the uttermost layer of lithic acid, we find these layers either alternating with the layer of the triple phosphate, or in some cases formed exclusively of this latter. These changes not only increase the volume of the calculus to a size which is unfavourable to its escape, but the addition of the lithates and mixed phosphates induces irregularity of surface, and in place of a smooth, or at most a slightly granular surface, the outermost layer adapts itself to the spot in which it rests, and often forms a kind of mould of the space in which it grows. It thus becomes permanently lodged, growing slowly, moulding itself to the interior of the pelvis of the kidney, and at first partially, but eventually completely, blocking up the entrance to the ureter, and thus gradually developing the symptoms and the condition known as calculous pyelitis. The subject of calculous pyelitis will be discussed hereafter, and it will become an important point to consider the differential diagnosis betwen this form of renal disease and tubercular or scrofulous pyelitis.

It has been stated that the amount of mucus in the urine in cases of renal calculus is a point of considerable practical importance; for so long as its amount is moderate, and the character of cells composing it mono-nuclear, with here and there a multi-nuclear cell (Gluge's corpuscle), there is little apprehension of any rapid increase of the calculus, and consequently up to this stage a possibility of the escape of the calculus from its prison-house in the kidney. It is always desirable in cases of renal calculus to hold out to the patient the possibility of such an occurrence, at the same time making known the character of the symptoms by which this escape may be recognised. This also serves the purpose of lessening the alarm which the patient may feel at the very urgent symptoms which usually accompany the descent of a calculus down the ureter. To the aggregate of these symptoms the very appropriate name of renal colic is applied. Usually without any special previous warning—saving, perhaps, some lumbar pain, or the aggravation of some of the previous symptoms, such as increased pain and uneasiness at the neck of the bladder—a sudden pungent griping pain occurs, with urgent but ineffectual efforts to void urine, for the bladder is usually empty. This paroxysm of pain is at first of short duration, but it is soon succeeded by fresh paroxysms, with a sense of deathlike faintness; more and more urgent the anguish increases; the body literally writhes with pain; posture after posture is assumed in seeking mitigation of the cruel griping colic. The face and forehead became drenched in sweat. Nausea at first,

becomes developed into vomiting; and it occasionally happens that after the first full act of vomiting, a temporary lull in the tempest of suffering follows. The patient eagerly seeks the recumbent position. During this tumult the respiration and circulation are only so far affected as they are related to violent efforts of straining, when the glottis is momentarily closed and the diaphragm and abdominal muscles fixed. So soon as the paroxysm of colic abates, the pulse and respiration become quite natural. The period of rest varies much: in some a day or two may elapse before a second, in others the attack is repeated after a very short period of remission. In these latter, after two or three of these paroxysms a complete interval of rest follows, and for a day or two nothing occurs to engage the patient's attention, except it may be that such measures of treatment may have been adopted as to leave some mark of their effects; and this is particularly so, if large doses of opium have been taken to alleviate the colic and relax the spasm of the ureter. In some future observations on the treatment of this form of renal distress this point will be further discussed.

The next phase of this form of calculous disease is usually of short duration, but nevertheless causing a momentary alarm and suffering on the part of the patient. It must be remarked here that this paroxysm of colic marks the descent of a calculus down the ureter from the kidney. Now, it may happen that weeks and months, even longer, may follow without any indication of renal or urinary disturbance, till a group of symptoms rise up which tell beyond doubt that the bladder has become the home of the calculus. But very many cases of renal calculus, particularly those belonging to the type just described, never suffer from stone in the bladder. The sequel to the renal colic is as follows, and the writer is in possession of twelve renal calculi from as many patients, which were voided with symptoms almost identical in each: all had suffered from antecedent renal colic:—On passing water the patient suddenly feels an obstruction to the passage of urine through the urethra. Urgent straining follows. Great pain and alarm, with a sickening feeling of nausea, are not unusual. After a short interval the obstruction suddenly gives way, and the urine bursts forth with a rush, and if fortunately the event happen when the patient is using a chamber-vessel, a smart ringing sound of something solid falling enables the patient to recover the calculus which has so long been the cause of all his distress. In women, the passage of a calculus through the urethra is not accompanied, except the stone be unusually large, by anything like the suffering experienced by a male patient. Such a favourable termination of stone in the kidney is by no means rare,

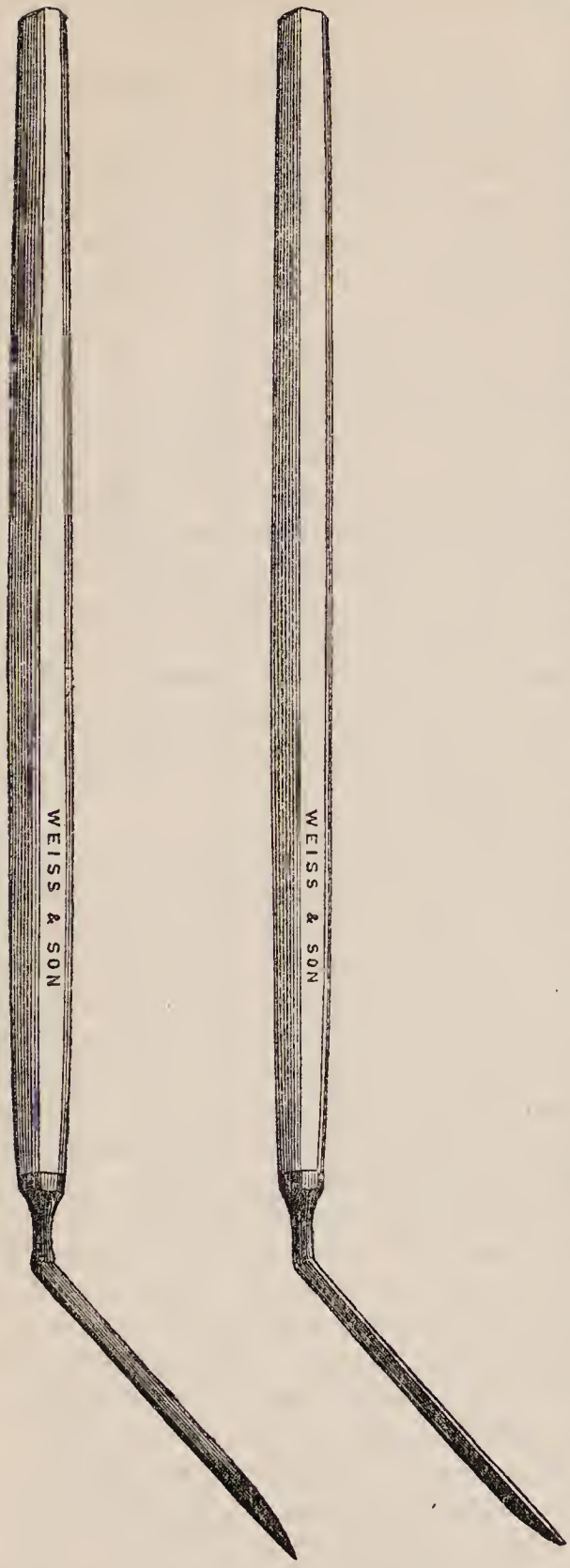
and the probability of the recurrence of the disorder depends greatly on the chemical composition of the calculus; it is therefore of the last importance for a correct prognosis that this characteristic of the calculus be correctly ascertained by analysis. The following conclusions may be safely relied on:— If the calculus be oxalate of lime, either chiefly or solely, it may be concluded that it is unaccompanied by others—in fact, that it is solitary; and the probability of the recurrence of the disorder reduced to a minimum. Experience justifies this prognosis. If, on the other hand, the calculus be composed of lithic acid, pure or mixed with lithates, it is almost certain that either there are others ready to follow the first, or at any rate that the material for their formation is in existence, and that sooner or later the recurrence of the disease may be expected. Hence, an important clinical induction follows, that in the lithic acid diathesis, those dietetic and therapeutic measures which experience teaches are the best alleviations must be unremittingly continued, or at any rate should be frequently employed, especially on the slightest sign of disturbed renal secretion. In the oxalic diathesis this is less needed, for the recurrence of calculus in the kidney when pure oxalate of lime concretion has been passed is extremely rare. — *Practitioner, December* 1874, *p.* 392.

AFFECTIONS OF THE EYE AND EAR.

58.—A NEW CATARACT KNIFE.

By C. Bader, Esq., Ophthalmic Surgeon to Guy's Hospital.

To obviate the inconvenience arising from the inward movement of the eyeball, when commencing the corneal incision in the operation for cataract, a new knife has of late been used. It so thoroughly answers its purpose that it can be recommended in preference to other cataract knives. If standing behind the patient, we wish to operate upon the left eye with the right hand, and upon the right eye with the left hand, two different knives—one for the right and one for the left eye—are required, unless the operator prefers using the right hand only, when the bent knife, used with the right hand for the left eye, may be used for the right eye also, commencing, however, the incision at the outer margin of the cornea. By the employment of the bent cataract knife, commencing the incision at the inner margin of the cornea, great control is obtained over the movements of the eyeball, whether the incision be made upwards or downwards. The natural inclination of the eyeball to roll inwards towards



the nose when operating in the usual manner, instead of being a source of trouble, becomes a help by the use of the bent knife. The blade is somewhat wider than that of von Graefe's knife, the point is in a line with the back, and the blade is bent away from the handle in such an angle as to admit of easy access to the inner (nasal) margin of the cornea.—The knife has been made for me by Messrs. Weiss, of the Strand.—*Lancet, Nov.* 28, 1874, *p.* 760.

[Mr. R. Brudenell Carter in a note to the Lancet of Dec. 5, with reference to this knife, says:—"I am sorry to be obliged to set aside the claim of my friend Mr. Bader to have invented a 'new' cataract knife. The right-hand knife of the pair which he describes was made for me by Messrs. Weiss about six years ago, and is still in my possession. On fair trial it seemed greatly to resemble the patent corkscrew, which had for its chief merit that it did not give much more trouble than the common one; and I soon relinquished its employment without giving an order for its left-hand companion. But it is my new knife if it is anybody's."]

59.—ON THE APPLICATION OF ATROPINE IN AFFECTIONS OF THE EYE.

By R. Brudenell Carter, Esq., Ophthalmic Surgeon to St. George's Hospital.

The use of atropine is best accomplished by a solution in distilled water of the neutral sulphate, of the strength of two grains to the ounce. This solution, if the drug be pure and neutral, is absolutely unirritating to most eyes; and a drop may be placed in the lower conjunctival fold, near the outer canthus, two or three times a day. For the purpose of making the application, there is nothing better than a goose-quill, cut to a blunt scoop; but, considering the highly-poisonous nature of the solution, it is perhaps safest to send it out in special bottles, with a dropping apparatus attached. Various contrivances have been devised for this purpose; but the best of them is a little blown-glass bottle. By heating the bulb of this bottle slightly in the flame of a spirit-lamp, the contained air is caused to expand; and then, by inverting the bottle, and dipping its beak into the solution, a sufficient quantity will be driven through the capillary opening by atmospheric pressure. In use it is only necessary to invert the bottle, to hold it in the warm hand, and to touch the lining of the lower eyelid with its beak, from which a drop will issue.

If the application of atropine should be painful, the most probable explanation is that the drug is impure or not neutral, or that sulphuric acid has been either set free by spontaneous changes, or added by the dispenser to obtain a clear solution. In such case, no time should be lost in obtaining a fresh supply. But when atropine has been long in use, the best preparation is apt to cause local irritation in some persons, and this irritation is usually more manifest in the eyelids, and especially on the lower lid, and on the adjacent skin of the cheek, than elsewhere. It may be readily recognised by a peculiar stiffness and dryness of the inflamed skin; and the swelling of the eyelid is usually sufficient to remove the lower lacrymal punctum from contact with the globe, and thus to produce an overflow of tears. Under such circumstances, the atropine must be laid aside, and some soothing application made to the closed lids. The best is, I think, the compound ointment of subacetate of lead of the British Pharmacopœia, which may be applied to the skin freely, and a soft bread-and-water poultice laid over it. But it is a rule without exception that no preparation of lead should enter an eye when there is any loss of corneal epithelium; because we are then liable to have an opaque deposit of carbonate of lead formed upon the surface. If the corneal surface should be ulcerated or abraded, it is the safest

practice not to let lead come into use, even as an external application, for fear of mischance; and in such cases I prescribe for the atropine irritation a simple ointment, into which a little sedative solution of opium has been stirred—perhaps in the proportion of half a fluid drachm to an ounce of ointment. There are some persons, however, by whom no preparation of atropine or of belladonna can be borne even for a time; all of them alike producing an erysipelatous inflammation. Such instances are rare; but there are few writers on ophthalmic surgery who do not record one or more from personal experience, and I have myself met with two of them. It is unnecessary to say that such an idiosyncrasy places a most formidable obstacle in the way of treating iritis and various other affections.

In the case of children, and especially the children of the poor, who are often roughly handled by their parents, and who have not learnt to trust to them, the proper application of atropine is sometimes a matter of considerable difficulty; and the solution is very apt to be washed out, or at least diluted, by tears. At hospitals we constantly see children for whom atropine has been prescribed, but whose pupils are not diluted. Occasionally, perhaps, no one at home has taken any trouble about the matter; but more frequently, I believe, the drops have gone over the cheeks, or anywhere but into the eyes, or they have been applied so roughly as to produce plentiful crying. In hospital practice such children can be brought every day, so that the application may be made effectually; and it will often be desirable to use, instead of the solution, the little wafers of atropinised gelatine which were devised by Mr. Streatfeild. I do not like these wafers for common use, because they often produce too much smarting; but for crying children they have a great advantage in the fact that they dissolve slowly, and that the medicament is not liable to be at once washed away by a gush of tears.—*St. George's Hospital Reports, vol.* vii., 1872-74, *p.* 121.

60.—ON DEPLETION IN DISEASES OF THE EYE.

By R. Brudenell Carter, Esq., Ophthalmic Surgeon to St. George's Hospital.

The practice of depletion, which was once largely followed by ophthalmic surgeons, is now confined within narrow limits. It seems scarcely credible, but is none the less a fact, that it was once customary to bleed copiously from the arm in iritis and in purulent ophthalmia, and even to follow the bleeding by the application of countless leeches. It is a curious matter of

history that the various devices for making a leech take more than once had their origin in the enormous demand for these creatures which was occasioned by the epidemic of contagious ophthalmia that prevailed in Berlin in the year 1820. At the present day, we take blood in eye-disease only sparingly, and chiefly by two methods—the natural leech and the artificial one. The natural leech is very useful in many superficial diseases; the artificial leech chiefly in those of the deeper parts of the eyeball. In any form of ophthalmia which is attended with great heat and swelling of the eyelids, in some cases of iritis, and in some cases of injury, including many operations for cataract, a leech may often be usefully applied. The best position is usually over the frontal bone, immediately external to the margin of the orbit, and a little above the level of the external canthus. I say a leech rather than leeches, because I think it undesirable to multiply bites. If more blood be required than one leech would be likely to draw, the best plan is to make a free longitudinal incision, with a sharp lancet, into the creature when it is nearly full, and it will then continue sucking until detached, being no longer inconvenienced by the distension of its alimentary canal and integument. The incision should be made in the side of the leech, near its caudal extremity. The artificial leech is much more rapid in its action than the natural one; and is essentially a cupping instrument, adapted to take a few ounces of blood quickly from the temporal region. The form in common use is that of Heurteloup, improved by some recent modifications. The cutting portion consists of a sharp punch, capable of being set to any desired depth, and made to revolve rapidly by releasing a coiled spring. The blood is received in a glass cylinder, which is pressed upon the skin around the wound, and which has a well-fitting piston, working by a screw rod. As the operator screws up the piston, the blood follows to fill the vacuum which is produced. The knack of application consists chiefly in not turning the screw too quickly; for otherwise, if the piston be drawn up faster than the blood can follow, the pain of the operation will be considerable. Whenever this method of depletion is used for deep-seated maladies, such as those of the retina or choroid, it is desirable to keep the patient in almost total darkness for the next twenty-four hours, so as to avoid a vascular reaction, by which the original congestion might be increased.—*St. George's Hospital Reports. vol.* vii, 1872-74, *p.* 123.

61.—OBSERVATIONS ON IRIDECTOMY, WITH AN ACCOUNT OF 118 CASES.

By Bowater J. Vernon, Esq., Ophthalmic Surgeon to St. Bartholomew's Hospital, London.

The operation of iridectomy, or the removal of some portion of the iris, is more frequently performed than any other in the whole range of ophthalmic surgery. Since the days of Cheselden, the formation of an artificial pupil by some modification of iridectomy has restored sight to thousands, and in our own time it has been successfully—and, it must be added, indiscriminately—resorted to as a remedy for certain progressive diseases of the eye as well. The discovery by Von Gräfe of its efficacy in glaucoma, and in other and allied diseases in which the intraocular tension was increased, took the surgical world by storm; and the immediate consequence was that it was performed, in many instances without any rational prospect of benefit, in all kinds of affections of the cornea and of the iris—in any case, in short, where there was stubborn inflammation to subdue, and even in not a few cases of long-standing amaurosis with the unwarrantable hope that some ultimate good might ensue.

This paper does not in any way pretend to give a complete history or description of the various modifications of the operation, but it seeks to define and put upon record the leading principles on which the operation has been performed by Mr. Power and by myself.

The cases are 118 in number, and may be conveniently divided into three classes, each of which has an accompanying table, and which deserves a separate notice.

Class I. Iridectomy for artificial pupil.
,, II. Iridectomy for glaucoma.
,, III. Iridectomy for iritis and allied conditions, and for the sequelæ of iritis.

The steps of the operation require no special mention, as they have not in any essential point differed from the methods which are fully described in any modern text-book, nor have I thought it necessary to mention the name of the operator in each individual instance.

Class 1.—The operation for the formation of an artificial pupil is in principle the same as that performed with such success by Cheselden in 1785. Since that day many varieties have sprung out of the old method, and much attention has been given to details which are more or less important under varying circumstances. Naturally the assistance afforded by anæsthesia has been very great, and has rendered the operation easier and safer, and has rendered its performance justifiable under diffi-

cult and disadvantageous circumstances. In a certain number the result is as satisfactory as could be wished, and although in by far the larger number there is something gained, my own experience, so far as it has yet extended, leads me to think that the amount gained is not really as great as is expected; the reasons for this are not far to seek, but are not, it seems to me, clearly understood.

The amount of damage inflicted upon an eye by a properly executed operation is exceedingly small, and it is surprising how little it is resented; except where blood has been left in the anterior chamber, the irritation and the ill-effects of the operation are at an end almost as soon as the corneal wound is healed. It is a well-established fact that a healthy iris will bear cutting with impunity, when a very small amount of pressure, as by pinching in a wound of the cornea, or by stretching during the escape of the lens through the pupil, or even the friction by flakes of soft lenticular matter during the solution of a cataract, will infallibly cause iritis. By far the majority of cases which require an artificial pupil are cases of opacity of the cornea, and it is to be noted first of all that impairment of sight is by no means in proportion to the apparent density or the extent of the opacity. Very much will sometimes depend upon the disposition of the opacity, and it will often happen that a nebula, so thin that it will hardly be detected except by oblique illumination, will interfere with vision much more than a very dense, although a more limited, leucoma. The effect of an opacity of the cornea is to scatter the rays of light in such a manner that the images of objects are blurred and indistinct; they are often surrounded by fringes of colour, and in many instances are multiplied. Any one of these defects is sufficient to prevent binocular vision, and rather than submit to them the patient will suppress the vision of the imperfect eye altogether; so that in a case of corneal opacity of long standing, there is very rarely any binocular vision, at least not for near or for small objects. The main feature of an operation under such circumstances is a displacement of the pupil; and when this has been accomplished, the rays of light gain access to the fundus through those portions of the lens, and in such a direction that the aberration, both spherical and chromatic, due to irregular refraction, must be excessive. The irregular shape and the large size of the new pupil must mar the distinctness of vision as well, so that, even under the most favourable circumstances, the images upon the two retinæ can never be mentally combined, and it becomes difficult in consequence to understand how binocular vision can be restored by an operation of this kind. We never meet with diplopia as the result of displacement of the pupil, which should assuredly

be the case if the images upon the two retinæ were of equal power, and when they are formed upon portions of the fundus which do not correspond with each other.

The determination of the existence of diplopia is never very easy amongst unintelligent patients, and with children it is out of the question. The complaint of "seeing things double" is often made, but when analysed it generally resolves itself into seeing things with indistinct outlines.

What the patient really will gain, and what is of the highest value to his comfort, and in every sense to his safety, is an extension of his field of vision for large and surrounding objects, and this alone is sufficient to render an operation expedient in almost every case of corneal opacity. It may even happen that the lateral vision may be seriously curtailed by an opacity, which may yet permit good vision for near objects in certain directions, but not in such a position as to allow of binocular vision: it is better for such a man to give up his near vision, which he will never exercise while his other eye remains sound, and to gain in exchange an amount of lateral vision, which will add greatly to his comfort. In the case of children small central opacities of the cornea are very apt to lead to the development of a squint, and this tendency may be obviated by an operation if it be performed sufficiently early; and in those sad cases of extensive opacity which sometimes follow the purulent ophthalmia of infants, it is advisable to avail one's self of the smallest portion of transparent cornea, with the hope that even a small amount of light admitted into the eye may assist in the growth of the recti muscles, and so prevent the restless oscillation which such eyes very often present.

In the performance of an iridectomy for artificial pupil there is a golden rule for the surgeon to bear in mind—The new pupil is to be as small as he can make it: if it be too large, there is disfigurement, and the vision is rendered indistinct by circles of dispersion and by other obvious optical defects; and if it should be large enough to extend to the ciliary attachment of the iris, the power of accommodation may be diminished. It is not so easy as it would appear to be, to enlarge the natural pupil by merely excising one of its borders; for when the iris has been gripped with the forceps it is very difficult to remove only just enough, and to do this it is necessary that the wound of the cornea should be almost over the situation of the new pupil. And if the healing of the wound should be followed by any haziness, as will be the case sometimes, then most of the benefit from the operation will be thrown away. In order to avoid this difficulty, the wound is made at the scleral junction, the iris is too freely excised, and the operation is done as if it

were required for antiphlogistic purposes, and not for optical considerations.

Class 2.—The indications which call for iridectomy as a remedy against progressive disease, and for antiphlogistic reasons, are now well understood, and they may be shortly described as follows:—

Increased intra-ocular tension under any circumstances, whatever may be the character of the disease, provided it is associated with any loss of vision, or with any of the subjective phenomena, such as flashes of light or coloured vision, or the appearance of pulsation in the vessels, especially in the arteries, all of which point to a want of balance between the intra-ocular and the intra-vascular tension within the eye. Under this head are classed all the forms of glaucoma, and those cases which under certain conditions of age and temperament are very prone to assume what may be called a glaucomatous aspect.

If there is one thing more certainly proved than another in the records of operative surgery, it is the power which an iridectomy, when properly performed, exercises over the progress of an attack of glaucoma. It must be stated, however, that judging from the number of cases of glaucoma absolutum which wander from one hospital to another in the vain hope of receiving benefit, either this fact is not sufficiently well known or the disease is very often not recognised. It cannot be too strongly asserted, that if performed early enough, the operation will restore sight; but if it be too late to hope for this, it should yet be done, for it will as certainly relieve the pain and other symptoms. This is not the place for any discussion on the theories which have been broached to explain its action, but it may be said here, that to be successful, the operation must be complete, and generally speaking, extensive. It will not be sufficient to enlarge the pupil, or to remove merely a small portion of the iris; it is absolutely essential to remove a section of the entire membrane, and to take especial care that the ciliary attachment is completely severed. It can never be too early to operate in such cases, but it may be too late; for when blindness is complete, and when secondary cataract has developed, and the whole eye is disorganised, should pain recur, it would be dangerous to trust to iridectomy. It is very likely to be followed by intra-ocular hemorrhage, and by increase of pain; the wound will not close, and the eye has to be removed. An eye which is absolutely blind from glacouma, if it becomes painful, should be removed; such eyes may cause sympathetic ophthalmia, or may become the seat of malignant growths.

Class 3.—*The sequelæ of Iritis.*—When the pupil is fixed by adhesions to the anterior capsule of the lens, its mobility is

impaired in proportion to the extent of the adhesion; and when the eye is exposed to bright light, there is a constant struggle on the part of the iris to free itself and to regain its mobility. The consequence of this is a state of irritation and of congestion, which is ready at any moment to light up into a fresh attack of iritis. Experience will not yet warrant us in predicting of any case of synechia whether it will or will not go through this stage of irritation and of ciliary congestion; much will depend upon the nature of the patient's occupation, and upon the amount of care which he can bestow upon his eyes, and still more probably upon the nature and the extent of the adhesions. In my own experience recurrent iritis is exceedingly common. This very evening I have seen a gentleman who has had he tells me, at least twenty recurrences since the original attack ten years since, and the descriptions of the disease in our text-books do not lay sufficient stress upon this fact. I must not be understood to imply that every case of synechia will cause recurrent iritis, or that iridectomy is always to be performed as a safeguard, but I do say that there is always a risk of recurrence, and this once established, there is a tendency to recur again and again, the eye being left a little more impaired by each attack; against this an iridectomy is a most valuable safeguard. It has been said that when the whole breadth of the iris has been cut through, the mobility of the pupil is destroyed; no doubt it is impaired, and the curative action of the operation is due to the fact that the iris is no longer able to struggle against the adhesions which confine it. Iridectomy is no doubt a clumsy way of effecting this, when all that is required is a division of the iris, so that its mechanical powers of contraction are annulled; but it is found impossible to divide the iris in such a manner as to leave the lips of the section apart from each other without removing a portion of its tissue.

Some good surgeons still hold the opinion that the prolonged action of atropine, extending over months, will in the end be efficacious in inducing atrophy and rupture of the adhesions by keeping them ever on the stretch. Undoubtedly it may do so when the adhesions are few and far between, and such are unlikely to cause recurrent iritis; but when the adhesions are extensive and membranous, the keeping them on the stretch is itself a thing to be avoided. The old argument against the use of atropine, that the adhesions are torn through by it and the capsule rendered opaque by their pigmented remains, being now decently buried, it is no uncommon thing to find a man of intelligence growing blind without knowing it, and it is still more common to find a lens dotted with pigment from old iritis without the patient knowing much about it.

With regard to the time at which the operation should be performed, it is advisable to allow the inflammation to subside; for if it be attempted while the inflammation is in progress, the tissue of the iris will be rotten and cannot be readily removed, the operation will be incomplete and imperfect, and the cell proliferation from the swollen edges of the iris will be so excessive that no good will result.

In all cases of total synechia—that is, when the entire pupil is blocked up by adhesions, and when the communication between the two chambers of the aqueous is obstructed—the operation is called for; but if it is to be of service it must be done in the early stages of the affection. The effect of a total synechia is most destructive; the communication between the chambers being destroyed, the aqueous humour which is secreted from the posterior surface of the iris collects behind it, and as the tissue of the iris bulges forward, the anterior chamber becomes shallow; for a time there is an increased intra-ocular tension, but the iris undergoes atrophy, and the aqueous is no longer secreted, and the eye becomes gradually soft. Under such conditions an operation is difficult and of no service; for if it can be satisfactorily completed in such a shallow anterior chamber, and upon such unhealthy tissues, the lens is nearly always found to be opaque. If the eye is still painful, there remains nothing but its removal; but if it is not so, then there is yet a chance that with the extraction of the lens at some future time, some small amount of vision may be restored.

It may happen that in operating upon such eyes as these, the capsule of the lens may be opened when the adherent iris is grasped, while the eye is actually inflamed, with the forceps, the opaque lens bulges into the wound, and the operator finds himself compelled to complete extraction under conditions which are most disastrous; the wound is full of blood, for in these cases the bleeding is considerable; the cataract is immature, and does not readily escape, and the vitreous drains away as water. The moral to be drawn from such a trouble as this is to operate early or not at all.

In many cases of anterior synechia there is a great liability to ciliary neuralgia and to intolerance of light, which will yield at once when the strain upon the iris is removed by division of the synechia. Experience has shown that it is at all times unwise to leave the iris entangled in a wound of the cornea; this is so certain, that in wounds of the cornea, with a prolapse of iris, however small, it is best to disentangle the iris at any cost when the case is first seen; unless this is done at once, it becomes impossible afterwards, and the mere division of the synechia causes a large and irregular gap in the iris, which is very detrimental to vision.

Iridectomy is performed by some in many affections of the cornea. Under ordinary circumstances I have no belief in its efficacy in such cases, and as those upon whom it has been performed wander from one out-patient room to another, it is doubtful if they derive much benefit from it. In some rare varieties of progressive ulceration it is, however, a remedy which may fairly be tried, more especially if there be any increase in the intra-ocular tension.—*St. Bartholomew's Hospital Reports, vol.* x., 1874, *p.* 169.

62.—ON CONICAL CORNEA, AND ITS TREATMENT BY OPERATION.

By Dr. JOHN A. NUNNELEY, Senior Ophthalmic and Aural Surgeon to the Leeds General Infirmary.

Perhaps the best idea of the difficulty of relieving conical cornea will be furnished by an enumeration of the principal among the many operations, &c., which have been suggested and carried out for its relief.

Repeated tapping of the aqueous chamber, with or without compression, has been resorted to to a very considerable extent, with, in the hands of English surgeons, usually negative results; French ophthalmologists, especially Desmarres and Desmours, however, speak of this plan, combined with careful and graduated compression of the eye, more favourably; in those cases, however, which have been benefited by this proceeding, the treatment has been much more prolonged than most patients here would submit to, I think.

Removal of the lens was many years ago suggested and practised by Sir William Adams, with the obvious purpose of counterbalancing the increased refractive power of the conical cornea; this was unsatisfactory, and appears to have been soon abandoned. Mr. Tyrrell appears to have been the first to recommend the alteration in shape and position of the pupil, so as to remove it from beneath the centre of the cornea, or that part which has its figure the most changed, to nearer the margin, where the rays of light are less refracted; the making an artificial pupil, in fact, by iridectomy; and this is the plan which has been the most frequently adopted, and been, on the whole, the most successful. It was pointed out by Von Graefe that, under these circumstances, the iridectomy answers a double purpose: 1st, by removing the pupil to a part of the cornea where the refraction is less, and, 2nd, by lessening the ocular tension, and so tending to arrest the progress of disease. In a paper in the Royal London Ophthalmic Hospital Reports for October, 1859, Mr. Bowman recommended Mr. Critchett's operation of iriddesis for conical cornea, and showed that, by a

double operation, one on each side of the cornea, reducing the pupil to a slit-like form, either horizontally or vertically, according to circumstances (usually the latter, as being more sightly), greater improvement to sight might be obtained than by any method previously tried. Von Graefe suggested another plan which has been in many cases advantageous, and which I have adopted on many occasions; viz., to produce ulceration of the apex of the cone, and, by the subsequent cicatrisation and contraction of this, obtain a flattening of the cornea; an indelible opacity remains, of course, in the centre of the cornea, and the position of the pupil has to be altered either by iridectomy or by iriddesis.

The operation which I performed in the present case is one which has lately been several times done. It consisted in the removal of an elliptical portion from the most prominent part of the cornea, and carefully bringing the edges of the wound together by sutures. By this means, a simple linear cicatrix is obtained, the opacity of which, if the wound heal well, disappears to a wonderful extent.

Alice Scott, aged 16, a domestic servant, was admitted into the General Infirmary on May 17th, 1873. Her general health, aspect, and habits were good. Four years ago she had scarlet fever, and from that time dates the commencement of her disease. She had lately not been able to see much with the left eye, the cornea of which was extremely conical, the apex of the cone being abraded and slightly opaque. The cornea of the right eye was also markedly conical, but to a somewhat less extent.

On May 18th, the following operation was performed on the left eye under chloroform. Two very fine curved needles threaded with very fine silk were inserted through the most prominent part of the cone, but not drawn through. In front of these needles, a small elliptical piece of cornea was removed by a long fine Von Graefe's knife and forceps. The needles were then drawn through, and the edges of the wound of the cornea thus made were brought together as accurately as possible. The lids were securely closed, and gentle pressure kept up outside; the patient was kept in bed.

May 19th. She had little or no pain.

May 21st. The anterior chamber had nearly refilled; there was very little inflammation.

May 22nd. Under chloroform, the stitches were removed. The corneal wound was perfectly healed, and the anterior chamber entirely refilled.

May 25th. She was allowed to get up.

May 31st. With the left eye, she could read No. 16 Jäger, while previously she could only distinguish quite large objects.

She was made an out-patient. She was readmitted on June 29th, 1873.

July 4th. The same operation was performed on the right eye.

July 26th. She could read No. 10 (Jäger) without glasses, and the sight was not improved by either concave or convex (spherical) glasses.

August 23rd. She could read without glasses, with the right eye, No. 10; with the left eye, No. 6. With concave cylindrical lenses, and with the right eye—2½, the axis of cylindrical curvature being perpendicular, she read easily No. 4 (Jäger); with the left eye, with—5½, the axis being placed horizontally, she read No. 3.

I am aware that the use of stitches, as in the above case, has by some surgeons been thought unnecessary; after, however, operating several times with and without them, I am satisfied that the risks are lessened, and that the best results have been obtained in these cases, where the plan above described has been followed, because the needles prevent much of the risk to the parts beneath the cornea during the operation, or any injury being done by the removal of the support of the cornea; but especially, the edges of the wound being brought together, it much sooner heals, and a single line of cicatrix is left, the opacity of which disappears in many cases almost entirely.—*British Medical Journal*, *Nov.* 7, 1874, *p.* 583.

63.—ON THE TREATMENT OF GRANULAR DISEASE OF THE CONJUNCTIVA.

By Edward Nettleship, Esq., Surgeon to the South London Ophthalmic Hospital.

It does not seem likely that anything will be found equal to nitrate of silver and sulphate of copper as local applications. When properly used they give results which, taking the nature of the disease into consideration, leave little to be desired. For general purposes there is nothing equal to a solution of nitrate of silver of 10 grains to the ounce of water, in which strength it is chiefly or wholly astringent. Ridgway, in 1812, came to the conclusion that this strength was the best, and precisely the same solution was strongly recommended by O'Halloran in 1824, who chose it after a prolonged trial of solutions varying from 1 to 30 grains in the ounce. Welch in 1869 still advised it. It is in common use at Moorfields. This solution applied daily with a moderately large camel's hair brush (the common penny brushes) cuts short most inflammatory attacks with great certainty and very much reduces the roughness and

redness of the lids in the chronic granular condition, unless this be of very old standing. In a great many cases nothing else is required. After using it for several weeks on a number of children it will be found however that some of them do not improve either as to discharge or the state of the lids. With these either a solution of 20 grains to the ounce may be used, or the mitigated solid nitrate. If the want of effect has reference chiefly to discharge I prefer the 20-grain solution. When, however, the case is one of old thick granular lids the mitigated caustic often has more and better effect, especially as its action can be regulated with considerable nicety. The solutions of the above strength should not be washed off from the conjunctiva unless in a very few irritable cases, and such will generally not be fit cases for treatment by silver at all. The solid diluted nitrate of silver should at first be washed off after 5—10 seconds with a solution of salt (5 grains to the ounce), or of chloride of zinc (2 grains to the ounce), either with a syringe or a large soft brush ; but it will be found after a few weeks that in many cases the application thus made has little effect, and it will be necessary either to wait from 15 to 30 seconds or more after applying the caustic before washing it away, or to omit washing it off altogether. The last procedure is perfectly safe in a great many cases from the beginning ; but as, if used in this way to all the cases, there is risk of producing increased irritation and corneal ulceration in a certain proportion, the more cautious plan is safer. The difference between the effect of washing off the caustic and not doing so may often be advantageously studied by using one method to the right eye and the other to the left of the same patient, supposing that the disease was at first symmetrical in degree. The difference in the amount of improvement is sometimes very markedly in favour of not washing off the caustic, while in others (the more irritable ones) these conditions are reversed. The mitigated caustic should at first never be used oftener than three times a week, though some old cases will be found in which its daily application is necessary. The 10-grain solution must be used daily or three times a week, according to the effect it is found to produce. In applying these solutions I think it is much the best to invert both upper and lower lids and allow a large drop to flow over them, accompanying this with one or two gentle movements of the brush so as to distribute it equally ; it is of importance to carry the brush high up above the upper edge of the tarsus in the upper lid, or this part, which is generally the seat of considerable structural change, will often escape contact with the solution. The same must be done in most cases with the solid caustic, though in this case more care is requisite in order not to touch the cornea ;

this accident (which has happened to me two, or perhaps three times) can be avoided partly by keeping the point of the caustic forwards instead of backwards and thus slightly lifting the upper lid away from the globe, and partly by pressing the inverted lower lid backwards and upwards, so as to intervene for a short distance between the globe and the upper lid.

Solutions of more than twenty grains to the ounce are unsafe unless washed off, and when this is done they have no advantages over the solid form, and are indeed less easy to localise than the latter. As a rule I prefer a solution to the solid caustic for young children, who often struggle a great deal, and for those elder children who are unruly; there is some risk of touching the cornea with the solid pencil if the head be suddenly jerked, and this cannot always be avoided even when the child is held between the knees.

A certain number of patients do not improve under the use of silver in any form, nor even when used at long intervals: a few others are made decidedly worse by it, the congestion being permanently increased, the granulations growing rapidly and bleeding on the slightest touch. Most of these are cases which derive much benefit from solid diluted sulphate of copper (lapis divinus) applied two or three times a week, or oftener, according to experience. Such as do not improve under either silver or copper will not, so far as I have seen, do so with preparations of either lead or tannin or tannate of lead. I have not, however, made any extensive or very prolonged trial with these substances, with the exception of the solid acetate of lead of which I shall say more below. Sulphate of copper is not, I think, any safer for average cases than the 10-grain solution of silver, while it is on the whole less efficacious and not so easy to apply, especially to young children. There are some cases in which it does decided harm of the same kind as sometimes follows the silver preparations, and my impression is that these occur oftener under the use of copper than that of silver. For these reasons I prefer the solutions of silver as standard applications, reserving the lapis divinus for those who get worse or do not improve under any form of silver. It is a curious fact, which I have several times observed, that children who are made worse by either of these substances are generally benefited in a marked degree by the other. I have been less struck with the necessity of changing the treatment than some other observers, the only decided impression I have on this point being that after no more improvement can be gained by silver, however varied in frequency or degree, the lapis divinus does sometimes carry the case considerably further.

There is no objection to the 10-grain solution of silver being applied by a careful and skilful nurse who has been taught how

to use it. This may be quite safely done with a large number of the cases, provided that the medical officer sees them himself at intervals of a few days so as to watch their progress. This is another practical reason in favour of this solution over the lapis divinus, with which in effect it is perhaps most comparable and the use of which could not be left indiscriminately to a nurse.

I have made many careful trials of the solid powdered acetate of lead, both according to the method of Buys, and the modified plan of Gouzeé which consists of applying the salt in a slightly moistened state instead of in dry powder. I applied acetate of lead in more than fifty cases, repeating it two or three times in several of these. The general result was that, when used on Buys' plan, the ordinary (acid) acetate (sugar of lead) had in most cases no effect at all on the granulations beyond whitening them for many months. It slightly increased the discharge when this had been present before, while in a few cases it did decided harm by leading after some months to ulceration of the cornea, due, no doubt, to the apices of the granulations being rendered harder and rougher by its presence than they would have been if left alone. When applied on Gouzeé's method I found that it did harm in a much larger proportion of cases, especially by causing ulceration of the conjunctiva followed by the formation of cicatricial bands which often imprisoned small lumps of the salt beneath them; these rough, projecting nodules and scars often after several weeks or months set up or predispose to relapses of conjunctivitis, and in several cases ulceration of the cornea was produced by them. In one child slight organic entropion occurred, which was, however, easily remedied by removing a horizontal fold of skin. I think, therefore, that the use of powdered salts of lead in the treatment of granular lids should be definitely abandoned as having no good effect and often a very bad one,

After the application of preparations of silver and copper cold fomentations should be used if there is much pain; they greatly relieve the present pain and the risk (which is generally greatest, I think, when the pain is most severe) of too great inflammatory action setting in.—*British and Foreign Medico-Chirurgical Review, Jan.* 1875, *p.* 191.

64.—ON THE USE OF A STYLE IN OBSTRUCTIONS OF THE LACHRYMAL APPARATUS.

By Dr. JOHN A. NUNNELEY, Senior Ophthalmic and Aural Surgeon to the Leeds General Infirmary.

It is not my purpose now to speak of affections of the lachrymal apparatus in general, but only of one method of

treatment of those diseases of the sac or nasal duct in which dilatation of the latter by mechanical means is necessary.

The difficulty formerly experienced in dealing with such cases is sufficiently shown by the great variety of probes of metal and catgut, of many shapes, and to be used in various ways, and of styles and tubes, and other mechanical appliances, which were devised, often with great ingenuity, with the object of dilating and keeping open the nasal duct. Except the simple style, introduced through the skin and the anterior wall of the lachrymal sac, these contrivances failed more or less in their object, and were abandoned. In many respects the treatment by the style was satisfactory enough. It had, however, some objections: its appearance was unsightly, it was liable to fall out or be dragged out in various ways, and after its removal in some instances the opening which was left refused to heal, and a lachrymal fistula was the result. Since the general introduction of the very simple and admirable operation of division of the canaliculus into the lachrymal sac, devised by Mr. Bowman, the description of which was published in the transactions of the Royal Medico-Chirurgical Society for 1851, the treatment of cases of epiphora, depending upon displacement of the puncta or obstructions of the canaliculi or nasal duct, has been reduced to narrow limits, this plan presenting such conspicuous advantages as to have been almost at once generally adopted. By it the sac and nasal duct can be reached and treated through the natural passages, without external wound. The advantages gained by this mode of procedure are many, and its disadvantages few. The latter are, mainly, that in order to keep open the wound along the canaliculus, which has been divided, it is necessary to pass a probe along it several times, or the incision will close (as it frequently does unless considerable care be taken); again, the probe must be passed through the nasal duct at intervals, longer or shorter according to the nature of the stricture. All this involves, of course, considerable pain, and is more or less tedious, usually requiring several attendances on the part of the patient, so that there is oftentimes difficulty, both in public and private practice, in persuading persons to persevere for a sufficient length of time.

These objections may be avoided, and the whole treatment greatly simplified, in most instances, by the use of a form of style introduced some years ago, I believe, by Mr. R. Taylor, surgeon to the Central London Ophthalmic Hospital, and which has scarcely, I think, been adopted so frequently as it deserves. It is highly spoken of by Mr. Haynes Walton, in his work on the "Surgical Diseases of the Eye." This style is a straight piece of silver to fit the nasal duct, having at right angles to

it, at the upper end, a small arm about three-eighths of an inch in length; it is introduced along the slit-up lower canaliculus, through the lachrymal sac into the duct. The little horizontal arm lies in the channel of the canaliculus, which it keeps open, and prevents the style from slipping out of sight, allowing ready removal when necessary. I have used it constantly, and with great advantage. The canaliculus is slit up in the usual way, and I then either dilate for a short time with the ordinary probe, and then put in the style, or more generally, where the case is a straightforward one, introduce the latter at once. Different sizes are required. The style requires to be taken out and cleaned occasionally, and if there be any irritation set up by it, which is not common, the removal of it for a day or two is generally sufficient to allow it to be worn with ease, and I find that patients are so comfortable while wearing it that they often neglect to appear at the end of a month or six weeks to have the instrument removed.

When we think of the very fragile bones by which the lachrymal apparatus is formed, and the danger which must always exist lest the passing of an instrument should injure them, or bruise their delicate lining membrane, the consequent swelling of which would increase, instead of lessening the evil, it must be evident that the use of a probe in the situation demands the greatest gentleness. A plan therefore which so much simplifies the instrumental treatment of many of these frequent, painful, and troublesome cases is a real gain.—*Lancet, April* 24, 1875, *p.* 570.

65.—THE THERAPEUTIC VALUE OF THE BALSAM OF COPAIBA IN SOME EYE AFFECTIONS.

By A. R. Hall, Esq., Surgeon, Army Medical Department.

[Copaiba is a valuable remedy in a variety of diseases, and not only in gonorrhœa or as a diuretic simply.]

One of the most satisfactory instances of the effect of any medicine that I ever met with was in a soldier of the Buffs, suffering from iritis, in India. In June 1872 I was asked by Surgeon-Major Collis, of that regiment, and Staff Assistant Surgeon Tothill, to see a patient in their hospital. I found the right eye highly inflamed, and the whole of the anterior chamber *filled with pus*. Of course, vision was entirely lost. The patient had suffered from repeated attacks of syphilis, and he had been treated with calomel and opium, counter-irritants, and a variety of alteratives, but with no good result. I certainly thought that the eye was gone beyond redemption; but I said that I had seen such good results following the exhibition of

the balsam in iritis, that it might be tried as a last resort. Two drachms were therefore ordered, in mucilage, three times a day. Two days after, the pain he had been suffering from subsided: daily, the pus could be seen to be gradually disappearing. At the end of ten days he could see the length of the ward, and after twenty days the eye was quite well. A short account of the case was published by Mr. Tothill in the Indian Medical Gazette for September 1872. As he writes, the balsam had acted "like a charm," and all who saw the man were convinced that, but for it, the eye would have been destroyed. I had repeatedly given it in cases of iritis, and almost always with benefit, but I never expected that it would act so well in this case.

I have been in the habit of giving it in all cares of iritis and sclerotitis for some years in India, and found it far preferable to turpentine, as it does not produce strangury, which the latter drug is very apt to do in that hot climate. The horrible pain of sclerotitis, the eye being described as feeling "like a red-hot ball," I have found often to subside after four or five large doses of the balsam, and the inflammation disappear. At Seetapore, in Oudh, during the year 1872, I had at one time more than thirty children suffering from purulent ophthalmia, under my care. I treated them all by simply painting the lower eyelids, upper part of the cheeks, and temples, with the pure balsam copaibæ, and they all got well quickly without any damage to the eyes. Mr. C. Macnamara, the ophthalmic surgeon to the Calcutta University Hospital, in his work on Eye Diseases, recommends the balsam in iritis; but I do not think that the advantages that apparently follow its use in almost all cases of inflammation of the eye are generally recognised.—*Practitioner, April* 1875, *p.* 241.

66.—REMOVAL OF FOREIGN BODIES FROM THE EAR, AND COUGH FROM AURAL IRRITATION.

By Dr. JOHN CLELAND, Professor of Anatomy and Physiology, Queen's College, Galway.

Looking over the chapter on "Foreign Bodies in the Ear" in the recently translated work of Von Tröltsch, I remark the objection made to instruments as being liable to drive the offending body inwards, and the preference given to a "properly directed stream of water," and am led to bring under notice an observation which I made twelve years ago, serving to show what the proper direction is in which an instrument should be made to act. When I was demonstrator in Glasgow, a student came to me in much alarm with a pea in the auditory meatus, which had been flung in a class-room, and had been

driven far in towards the membrana tympani by the efforts of one of his fellow-students to remove it. It fitted sufficiently accurately that there was no space for the introduction of an instrument behind it. I had no instrument beside me but a straight needle for microscopic purposes. I touched the upper margin of the pea with this, endeavouring to introduce the needle behind the pea, when the pea rolled somewhat and receded. It then occurred to me to place the point of the needle beneath the pea, and, to my great surprise, I had scarcely begun to insinuate the point of the needle when the pea flew out with great violence. Anyone may repeat the experiment, as I have done, with a pea, a tube, and a needle, and may easily arrive at the explanation of what happened in the case which I have mentioned. If the needle be placed above the pea, it presses on the uppermost part of the sphere. By a movement of combined pressure and withdrawal the pea may then be made to roll outwards for a little distance; but in this movement needle and pea move together, so that the point of the needle, continuing to press on the portion originally uppermost but now rolled outwards, ceases immediately to act in a purely downward direction, and jerks the pea back towards the membrana as soon as the increasing pressure inwards exceeds the resistance of friction against the floor of the tube. But if the point of the needle be placed below the pea, it raises it up; and if it has been insinuated in the smallest degree beyond the lowest part of the sphere, and be on a higher level than the handle, the pea tends to roll out over it. It is not, however, essential that the point of the needle be on a higher level than the handle, provided only that the needle be properly insinuated in; for as soon as the handle is depressed so far that the point is at all inclined towards the roof of the tube, the pea is placed between two inclined planes, from between which it is expelled with force.

The circumstance that in the same chapter of the work above referred to allusion is made to the occurrence of coughing from irritation in the ear leads me, while pen is in hand, to notice a curious enough example of this. The membrana tympani of my own right ear was perforated by suppuration in scarlatina at three years of age, and otorrhœa continued for nine years. There is one particular spot of limited extent in the floor of the meatus, about an inch from the outside, and not extending inwards to the membrana, nor at all to the sides or roof, which, when pressed on by an instrument, produces uncontrollable and most violent coughing. It is not more tender to the touch than the other parts of the meatus equally far in, or the corresponding parts in the other ear, which produce no such phenomenon. It is of some importance, physiologically, to

note, what may not have been observed in such cases hitherto, that the immediate effect of the aural irritation is a peculiar sensation in the throat, referred to the back of the larynx; that is to say, it seems further back than the tickling sensation which produces an ordinary cough. This, therefore, is not a simple reflex action in which the irritation conveyed by one sensory nerve acts immediately on a motor centre governing another part. A precisely similar phenomenon may be occasionally observed when the pressing open of an acne on the ridge of the nose causes the sensation which brings on a sneeze. —*Lancet, Dec.* 5, 1874, *p.* 797.

DISEASES OF THE SKIN.

67.—ON A CASE OF HERPES ZOSTER TREATED WITH ZINC PHOSPHIDE.

By Dr. J. Ashburton Thompson, Surgeon at King's Cross to the Great Northern Railway Company, &c.

A. B., a youth, aged 18, was under treatment for an indolent ulcer of the right shin, the result of an injury inflicted some weeks previously. He was thin and pale, suffered loss of appetite in addition to other symptoms of general debility, and appeared to have been originally endowed with a feeble constitution. He pursued a sedentary occupation. He had been treated for some time with an iron mixture, when, on one occasion of consultation, he complained of severe pain in the right chest wall, which had begun forty-eight hours before; and, on examination, some patches of herpes were discovered. They were four or five in number, of which that furthest back, situated on a level with the tenth dorsal vertebra, showed some vesicles already containing a milky fluid. The remainder were transparent. The most anterior patch was incipient; a few vesicles were discoverable, but they were quite small. The rash coincided with a line exactly transverse to the axial line of the body. A severe pain was complained of, and was described in terms usually applied to nerve-pain. To take, in addition to the tonic already prescribed, one-third of a grain of zinc-phosphide every three hours.

On the third day of disease, or about the end of the twenty-fourth hour of treatment, it was observed that many of the vesicles in the older patches were shrivelled, while one or two were actually dry; the anterior or youngest patch had aborted, and there was nothing to be seen in the situation it had occupied but some redness, and the remains of those vesicles which were in course of development on the previous day. The pain was now so much lessened as to be inconsiderable.

On the fourth day of disease, the treatment having been pursued during forty-eight hours only, all pain had gone, and the progress of the eruption had ceased. In a few days more nothing was left but a little redness of skin over the older patches and some roughness. It is not unusual to see herpes zoster abort in a somewhat similar manner to that just described. But the process is observed only in persons who are strong and otherwise healthy; nor is it completed until about the sixth day. The termination of this case is therefore not to be ascribed to a natural process of resolution.

I have elsewhere treated of the power possessed by phosphorus over certain forms of neuralgia. In those cases in which the nerve pain has a special relation to debility, this drug effects a cure with a certainty and rapidity which approximate its action to that of a specific remedy. This is most true when the debility is attended by marked anæmia, whether that be the result of hemorrhage, or the less direct result of other causes. In the case under consideration these conditions of anæmia and nerve pain were coincident; and notwithstanding that the occurrence of an eruption in this disease points to some modification of the ordinary conditions of nerve pain, which do not involve any lesion of the skin, yet the latter was successfully treated by that drug which I have found most effectual in simple asthenic neuralgia. This result ceases to be remarkable when it is remembered that although intercostal neuralgia very frequently accompanies herpes zoster, it is not an essential of the disease. Considerable difference of opinion exists as to the percentage of cases in which the pain and the eruption concur. The cutaneous nerves may, nevertheless, have a direct connection with the production of this rash; and that being so, it becomes plain that two conditions of nerve may exist in the same disease, of which one is not invariably present. As for the other symptom; *herpes*, it is true, cannot be recognised but by the eruption; but, to generalise a little more widely, is it not probable that the symptom which lends a name to the disease, is also a symptom merely—an accident liable to attend upon many neuralgias, which are known by this descriptive term alone? Some support is offered to an answer in the affirmative by the case related; for, not only was the pain at once and speedily removed by the remedy appropriate to it, but simultaneously *the eruption* aborted; that is to say, that the symptom which observation has shown to be accidental was removed; that the symptom which warrants the appellation of *herpes* was removed too; that the latter, therefore, is also an accidental symptom, and that cure was effected by the specific action of phosphorus upon an unascertained condition of the cutaneous nerves. On this view the

disease called herpes is a nerve disorder, sometimes evidenced by pain alone (neuralgia), sometimes by a rash only (herpes), and sometimes by the two together. To complete the investigation which is suggested by these remarks, it will be necessary first to confirm the above observations in a number of similar cases, and then to observe the effect of phosphorus on herpes uncomplicated by pain.

A more direct connection exists between the state of the nerve-trunks and skin eruptions than is generally taken into account; and phosphorus has special powers over this part of the nervous system. Eruptions not distinguishable from the diseases psoriasis and eczema have been known to occur on the surface of limbs of which the main nerve trunk had sustained injury from accident or disease, and to be confined to that situation; and further than this, to have disappeared upon the removal of the local nerve disease. It is over the nerve trunks, and more particularly when they are superficial, that phosphorus exerts special powers. This is exemplified in cases of acute neuralgia, occurring in persons who are otherwise in good health. A person employed in exposed situations sustains a continued application of cold and damp air to the side of the face, and is shortly attacked by neuralgic pain in the trifacial nerve. Such a case as this will yield with rapidity and certainty to a few stimulant doses of phosphorus. The cause of the attack is local—the attack confines itself to a definite situation, and the remedy removes the condition in too short a time to allow of any modification of the general state of the patient. Although this seems to point to a specific action of the remedy upon the *nerve* affected, it seems to me extremely probable that the morbid condition involved is in fact some interference with the blood supply to it. This, I think, is in a measure supported by the analogy which may be observed between the action of croton oil in this disorder and that of the drug under consideration. No more ready remedy for such an attack of acute trifacial neuralgia as that referred to is known than this drastic purgative; but no specific powers are, so far as I am aware, accredited to it. It is therefore possible that it acts in virtue of its power as a drastic to disturb the balance of the circulation, and in this way may restore that to the affected nerve of which it has been deprived by the paralysing effect of cold, and which is essential to its healthy action. Notwithstanding this, however, a distinction may be drawn between this action of phosphorus, apparently most directly exerted upon the state of the capillary circulation of the nerve trunk itself, and the power which it possesses of modifying the general capillary circulation of the surface.

Bearing in mind these four modes of operation on the skin,

that is, by expanding its capillary vessels, by contracting them or giving tone to them, by operating on it more directly through the cutaneous nerves themselves, or lastly, by remedying a general state of anutrition, it becomes plain that remedial effects may be anticipated of this drug in a variety of skin disorders. Thus, for example, in the first manner it may be used with marked effect in promoting the rash of measles, scarlet fever, typhus, and other eruptive fevers; in the second it may be expected to operate favourably upon psoriasis, which is one of the congestive skin diseases; in the third, as it was observed to act in the case above described, in arresting the normal course of *herpes zoster;* and, lastly, it may be expected to afford signally successful results in those eruptions which depend upon a general condition of mal-nutrition and anæmia.

Practically, phosphorus has been found by Drs. Broadbent and Eames to be possessed of powers over chronic skin diseases, which are superior to those of arsenic in the rapidity with which they are evinced. Psoriasis, eczema, acne indurata, lepra, lupus, and scrofulo-derma have all of them, and that in more than one or two instances only, yielded to this drug with marvellous rapidity, notwithstanding that in some cases the affection was of old standing. In the face of the probabilities above indicated, and of the facts last referred to (which are well known) it is not quite clear for what reasons its employment has not been more generally adopted. Probably the difficulty of administering free phosphorus has hitherto contributed a sufficient obstacle; a word therefore upon the form best adapted to the present purpose will not be out of place.

It will be observed that the case of *herpes* was treated, and was treated successfully, with the phosphide of zinc. The decomposition of this drug within the body affords the effects of free phosphorus; in my opinion, ten parts of zinc phosphide are equivalent in therapeutic effect to one part of the uncombined element. The other phosphides and hypophosphites are not ascertained to afford the effects of free phosphorus. This compound, which, given in a dose of one-third of a grain repeated every two or three hours, is, generally speaking, sufficient to remedy such an attack of neuralgia as accompanied the rash in this case, and was therefore employed in it, is not that which appears to me best adapted for the treatment of other forms of skin disease. Many of these attend upon states in which advantage may be gained from the use of cod liver oil; and, at the same time, that a solution of solid phosphorus in oil is that form which best ensures the absorption of the drug in its free and most active state, this fish oil is that one

which alone does not expose the element to changes which are either destructive of its remedial powers, or render it dangerous to the patient. These, therefore, are two reasons for employing in such cases a solution of the drug in cod-oil; a third may be found in the fact that such a solution possesses neither the smell nor the taste of the element. Still, patients are found who will not or cannot take the solvent; under these circumstances, no more elegant or effective means of exhibiting phosphorus exists than a concentrated form of the same solution enclosed in little gelatine envelopes forming what are known as "*perles*." These, it need scarcely be said, are quite tasteless; and if taken immediately after meals, cause little or no phosphoric eructation.

The dose of phosphorus which may be given with advantage will vary strictly with the object in view. In the example before us, acting on my knowledge of the treatment most desirable in acute neuralgia, it was attempted at once to induce the stimulant action of the drug, by giving full doses of the zinc-phosphide; and this result being obtained, the disease was cured. So, in the eruptive fevers, it is the stimulant effect of the drug which it is desired to produce, and it must be attempted in the same manner—by exhibiting full doses from the beginning of treatment. As a rule, for this purpose I should be inclined to prefer phosphorus in an alcoholic or etherial solution, given in a dose equal to one-twelfth of a grain, and repeated every four hours. But where the object in view is to give tone to the cutaneous vessels, or to improve the general nutrition of the body, a much smaller dose of the element should be employed, and its administration must be continued for long periods. In these cases, if the patient can be persuaded to swallow a large dose of cod liver oil, he may be allowed to take the thirtieth part of a grain of phosphorus, dissolved in from two to four drachms of it, thrice daily. If, however, this amount of the solvent be objected to, or be deemed unnecessary, the "perles" may be employed. These can be obtained containing the dose named in about four and a-half minims of oil; but, if these preparations be employed, I prefer to administer the same dose in a larger number of capsules (containing a more dilute solution), since, by this means, much unpleasant eructation may be avoided, to which the more concentrated solution does give rise, notwithstanding every precaution.

In this way free phosphorus may be administered for long periods with perfect safety, provided the quantity employed does not exceed one-fourth of a grain *per diem*—an amount which, probably, it will seldom be necessary to employ in the treatment of skin diseases. Nor, except under special circumstances, will it be found necessary to seek any other method of exhibition.

Thus, although it is possible that with further knowledge of the effects and mode of action of phosphorus in cutaneous disorders, some other more advantageous mode of employing it may be devised, for the present, at all events, I consider that this one fulfils all the necessary conditions of safety and physiological activity. It is in these matters that the pharmaceutical preparation of phosphorus has, until quite recently, failed; and since any imperfection in the preparation employed leads on the one hand to the serious risk of the patient, or, on the other, to disappointment in the result of treatment, probably a knowledge of this method of exhibition will lead to a further and more systematic inquiry into the value of phosphorus as a remedy in chronic skin disorders. The result of treatment with the remedies at present at command is scarcely so satisfactory as to render such an investigation superfluous, while the result of observations hitherto made has, so far as they are reported, been remarkably successful. From a consideration of these notes and some knowledge of the physiological action of the drug, I scarcely doubt that phosphorus will acquire a just reputation in the treatment of chronic skin diseases not inferior to that at present enjoyed by arsenic.—*Glasgow Medical Journal, Oct.* 1874, *p.* 460.

68.—ON PSORIASIS PALMARIS.

By Edgar A. Browne, Esq., Hon. Surgeon to the Eye and Ear Infirmary, and Dispensary for Skin Diseases, Liverpool.

[Few diseases of the skin better repay treatment and attention to details of management than psoriasis palmaris, few are more hopeless if left to "nature," or treated on wrong principles.]

The following case may serve as an example:—A gentleman in easy circumstances, but of a nervous anxious disposition, came under my care. He had been subject to the disease for many years, in the right hand especially, which at his first visit had the epidermis of the palm and portions of anterior surface of fingers torn, broken, and fissured in all directions, the subjacent skin being inflamed and thickened; nowhere would the scales scrape off in silvery flakes, no sensibly moist exudation was visible. The scales were constituted by shreds of epidermis, detached at their circumference, but attached by their centres. He had been under many practitioners, who seem to have had a suspicion of syphilis—a suspicion not confirmed to my mind by investigation either of objective symptoms or the patient's history. Taking into consideration the bilateralism of the

disease, its recurrent nature, and the nervous type of the patient, I placed him at once on six minims of Fowler and half a drachm of liquor potassæ, and ordered him to rub in an ointment composed of seven parts zinc and one mercurial. I may mention that mercury was not used antisyphilitically, but in accordance with my usual local treatment of chronic exudative diseases accompanied by much thickening. In three weeks the physiological effects of arsenic were beginning to show themselves, the infiltration of the skin much reduced. The medicine was diminished to one half, and a weak preparation of oil of cade rubbed into the part affected. In five weeks a slight pinkiness of the palm and an imperfect line of desquamation along the ulnar margin of the hand were the only evidences of the disease left. He considered himself cured. This case yielded much more readily than usual to treatment, owing probably to the fact that the patient was in sufficiently easy circumstances to keep his hand at rest till the cure had commenced. It is far otherwise with workmen who cannot forego the use of their hand. Like eczema in other parts of the body it is much influenced by external irritation. I have almost always one or two workmen in attendance at the dispensary; they derive benefit from the use of ointment, but are practically incurable—unless on strike. In a less degree this applies to patients of all classes, and it is a useful practical fact to remember that if a case is more than usually obstinate, and there is no mistake in the diagnosis as regards syphilis, some external source of irritation is probably at work. And here we see the importance therapeutically of regarding this affection as eczema rather than psoriasis. The latter disorder is one produced by causes acting from within; external irritation seems to play no part in its production, nor has it been experimentally imitated. On the other hand, eczema is especially determined by external agencies and easily produced experimentally. Hence, although the local treatment of psoriasis is very like the treatment of chronic eczema in principle it must differ in degree. The somewhat rough and severe handling which is often the only mode of removing chronic psoriasis is in itself sufficient to maintain or even to increase the violence of an eczematous attack.

The main points to be attended to in the treatment are obvious, but I may, perhaps, briefly glance at them.

The hand must be kept at rest, the employment of tools, driving, fingering samples, and so forth, absolutely forbidden. The horny layer of the epidermis is thicker and less porous than in other parts, and should be softened by prolonged packing with wet compresses, solutions of potassa fusa, soft soap, or borax, according to the severity of the case. Except while

these are being applied the palm should be kept thoroughly anointed with grease; if there is much infiltration and thickening of the corium an ointment containing mercury should be employed—weak citrine, the mercurial ointment one to seven or six, or the oleate of mercury, full strength. When the inflamed patches are very indolent I think the best results are got with the iodide of sulphur ointment rubbed in frequently. Any spots resisting the action of these remedies should be lightly touched with the acid nitrate of mercury so as to produce a raw surface. The case will be completed as in chronic eczema of other parts by stimulation with tar, the oil of cade being the nicest preparation. Some discrimination is required in apportioning the amount of soothing or stimulating treatment necessary in any given case, but as a general rule a case that remains stationary under soothing applications requires a stimulant.

As regards the general treatment: bilateral recurrent chronic cases are favorably influenced by arsenic; it should be given in full doses aided by alkali, or if intestinal irritation is easily set up guarded with a little bismuth and tiny doses of opium. The patients will frequently be found suffering from some error of assimilation or excretion tending to produce that condition of debility most favorable to the onset of eczema.

The habit of counteracting with alcohol the torpidity induced by a sedentary life is often a great obstacle to success. The patients obstinately refuse to believe they can maintain their strength without stimulants, or that they take more than is absolutely necessary for their well-being. A glass or two of wine at dinner does no harm—may possibly do good by aiding digestion, but beer and spirits and drinking between meals should be forbidden. No other dieting is, as a rule, necessary. —*Liverpool and Manchester Medical and Surgical Reports*, 1875, *p.* 186.

69.—THE TREATMENT OF SCABIES.

By Dr. Robert Liveing, Physician for Skin Diseases to the Middlesex Hospital.

There are three principal methods of treating scabies: 1. By sulphuret of potassium baths; 2. By sulphur vapour-baths; 3. By sulphur ointment. It may be a satisfaction to those who cannot conveniently use the sulphur-baths, to know that the treatment by inunction of sulphur ointment is the most efficacious of the three methods.

There are three mistakes commonly made in treating scabies, especially in private practice: 1. In not applying the remedy over the skin of the whole body, except the head; 2. In using

the ointment of the British Pharmacopœia, which contains one part in five of sublimed sulphur, and is too strong, especially for children; 3. In using the ointment for too long a time, and thus producing an irritable state of the skin. This often happens when people attempt to *treat themselves* for what they believe to be the itch. On the two latter points, most experienced observers agree: but on the former some difference of opinion exists. In a lecture recently published, my friend Dr. Tilbury Fox remarks: "It is a rule of prime importance in treating itch, to accurately determine at the outset how far the acari have disseminated themselves about the body. The reason is obvious. There is no need to apply parasiticides to parts in which the acari do not exist, because the irritation and eruption elsewhere are due to sympathetic action; and these irritated parts will get well, if the acari be destroyed, and they do not require the use of irritant remedies, such as parasiticides are, but soothing remedies. The practice is to apply the remedy to every part of the body where eruption exists in case of itch. Clearly this is wrong, from what I have just said. My rule is this: if the disease be recent, if it be only slightly marked, if it began about the hands, and there be no cuniculi about the penis, I order the parasiticide to be rubbed into the interdigits, the palm of the hand, and the wrists, and I apply a soothing lotion to all other irritable parts of the body. . . I repeat, then, by way of summary, in private practice, if the disease be slight and recent, use the parasiticide to the hands only, and soothe the other parts with some emollient or astringent lotion or ointment."

In the first place, I would remark, that in private practice it is in many cases next to impossible, and quite unnecessary, especially in women and girls, to examine the abdomen, thighs, and every part of the body, to ascertain how much of the eruption is due to scabies, and how much to sympathetic action.

The best plan of proceeding is, in my opinion, as follows. Having once ascertained that scabies exists, order one thorough application at night of mild sulphur ointment to the whole of the body, except the head, and direct the patient to sleep in the drawers, jersey, and socks that he has used the day before; this will secure the death of any stray acari about the body or in his underclothes; in the morning, he should use a warm-bath. The after-treatment should consist of the local inunction of the ointment, into those parts only which are especially affected, for two or thee nights. In all mild cases, the cure by this plan is quite certain, and is attended with very little inconvenience. The objections to sulphur-ointment are its irritating qualities and its smell. The first is avoided by using an

ointment made with half a drachm to two scruples of the precipitated sulphur to one ounce of lard. The precipitated is in finer powder, and less gritty than the sublimed sulphur, and more efficacious. A great part of the inconvenience arising from the smell of the sulphur may be avoided by using it only during the night. A drop or two of sandal-wood oil will quite disguise the smell. In cases of long standing, it is necessary to have the clothes baked; but a temperature of 190 deg. to 200 deg. Fahr. is quite sufficient, and the bed may be easily fumigated by using a little sulphur sprinkled on the cinders (not too hot) of a warming-pan.

It often happens that the irritation of skin remains after the scabies is cured, and thus induces people to go on with the sulphur treatment too long. Instead of doing so, a mild stavesacre ointment should be used, made with the oil of stavesacre and lard; this relieves the itching, and at the same time will kill any stray acari that may have escaped death from the sulphur. —*British Medical Journal, Jan.* 30, 1875, *p.* 137.

70.—TWO CASES OF ALOPECIA SUCCESSFULLY TREATED BY LOCAL STIMULANTS.

By E. C. Robson Roose, Esq., Surgeon to the Brighton and Hove Provident Dispensary.

Case 1 was that of a married man, aged 54, with a large family of perfectly healthy children. He had always enjoyed good health until about a year previously, when he experienced a sudden and severe nervous shock. Shortly afterwards, he first noticed symptoms of baldness, his hair becoming thinner and falling off, particularly over the head; so much so, that in a few weeks his scalp presented a perfectly white and shiny appearance, with no vestige of hair left, rendering the use of a wig necessary. The disease continued gradually to spread, until the whole of his body was more or less implicated. When he applied to me, he stated that he had been under treatment for some months, but with no benefit; and, to use his own words, "had been discharged as incurable." On making a careful examination of his body, I found a condition of almost general alopecia to exist, the skin having an uniform white, smooth, and shiny appearance. I put him under a strictly nutritious and digestible dietary, and prescribed tonics to improve his general health. Locally to the scalp I painted on some blistering fluid, repeating the application once a fortnight, and ordered the following lotion; carbonate of ammonia one drachm, tincture of capsicum one drachm, rectified spirit one ounce, glycerine one ounce, and rose-water to eight ounces, to

be applied freely over the body night and morning. For two months I could distinguish no appreciable improvement in his condition; but, after that period, new hair, very silky and quite white, began slowly to grow, and became thicker and stronger until the body and head assumed all the appearance of health, being well covered with hair over the different regions, although the colour of that hair, originally dark brown, was now permanently quite white. In this condition he was discharged as cured after seven months' treatment. About three months afterwards I met him, and he stated that he had experienced no return of the disease in any way. I may here observe that, in this man's case, there was no history of acquired or congenital syphilis, or, in fact, any apparent cause for the disease beyond the shock he mentioned.

Case 2 was that of a married woman, aged 32, with five children, who applied to me with alopecia circumscripta of two years' standing. Her husband and children appeared quite healthy, and she stated that she had never known a day's illness, and that the disease seemed in no way to affect her general health. I could obtain no information as to the origin of the disease, and there was no evidence of any constitutional disturbance that could have caused it. The scalp, upon examination, presented a series of white, smooth, ivory-like patches, bounded irregularly by healthy hair. This case was treated upon the same principle as the former, the blistering fluid being applied at intervals of three weeks, although not with the same speedy effect, as, from the soreness of the scalp, the treatment had to be stayed from time to time. The disease also appeared to be more intractable, it being upwards of seventeen months before she was discharged thoroughly recovered.—*British Medical Journal, Nov.* 14, 1874, *p.* 618.

SYPHILITIC AFFECTIONS.

71.—ON THE TREATMENT OF SYPHILIS.

By R. Brudenell Carter, Esq., Ophthalmic Surgeon to St. George's Hospital.

The instances in which we are led by iritis to the discovery of an early stage of syphilis present no difficulty with regard to treatment, except such as may arise from the incredulity or the circumstances of the patient. We have but to cure the iritis in the ordinary way, and to apply to the syphilis the principles which Ricord has so clearly stated. If the patient will not take mercury for the necessary time, so much the worse for him; and if he is forwarned of the probable consequences

the surgeon is relieved of all responsibility. That the mercury should be cautiously given, and in such a way as to avoid the production of its poisonous effects, is a matter of common sense on which it is unnecessary here to dwell.

When the period of primary syphilis has long passed away, and when mercury has been given for a few weeks, it is much more difficult to decide upon the course to be pursued. We have, then, two remedies between which to choose, mercury and iodide of potassium. Of these, iodide of potassium is the more rapid in its influence upon the symptoms actually present, but it probably possesses little or no power to modify the systemic malady. Nothing in clinical history is more remarkable than the rapid amelioration of the symptoms of late forms of syphilis under the use of the iodide; nothing is more certain, generally speaking, than their recurrence in the same or in some modified form. Mercury, on the other hand, will be slower in producing its first action, but more effectual as against the syphilitic taint; although it is not proven that syphilis of long standing can be cured by mercury, at least with anything like the same certainty as the earlier stages of the disease. It is in the eye, however, that the immediately curative effects of mercury are most remarkable; and it is from its visible action upon iritic effusions that many inferences have been drawn with regard to its supposed kindred action in parts of the body that are concealed from view—as, for instance, in the pleura. I am indebted to my lamented friend the late Dr. Anstie for the suggestion that these inferences may possibly be in some degree erroneous. He believed that mercury has some special elective affinity for, or special action upon, the parts which are supplied by the fifth nerve, and did not admit that its manifest influence upon iritis is necessarily an evidence that it will exert a similar or equal influence elsewhere. In support of this view it may be said that the poisonous effect of mercury is displayed first upon the gums, which derive their nerve supply from the source indicated; and we may also find something analogous in the deposition of lead in the gums, coupled with its tendency to produce atrophy of the optic nerves. The suggestion is one upon which I need not dwell, but it will serve to call to mind the powerful effect of mercury upon the eye, as well as the possibility that the argument from the eye to other organs may be fallacious. Returning to the question immediately under consideration—the choice between mercury and iodide of potassium—it may, perhaps, be said that the best rule of practice is to inquire whether the local changes in actual progress are such as to inflict irreparable injury unless they are speedily arrested. If they are, iodide of potassium should be given in the first instance, and should be continued

until a distinct impression is made upon the case; when it may be laid aside, and mercury given instead of it, with the hope of anticipating subsequent phases of mischief. If the changes in progress are not of this pressing character, it may often be best to give mercury from the first. A corneal ulcer threatening to spread or to perforate, so that in two or three days it might permanently impair the eye as an organ of vision, or an amount of effusion in the nerve disc likely to lead to speedy atrophy by its interference with the local circulation, would either of them call for the most rapid influence that the iodide could afford. A mere haziness of the cornea, or a turbidity of the vitreous body, or a limited amount of retinal or choroidal change, may be taken to illustrate conditions in which it would be legitimate to wait for the more gradual operation of mercury.

The mode of administering iodine of potassium has been already described; and, concerning the administration of mercury, there is nothing to be said which has any special application to the eye. The skill of modern pharmaceutists has multiplied preparations; but by these I have not been tempted to forsake old and trusted friends. Sir Astley Cooper was wont to tell his pupils that if they were much addicted to new remedies two results would inevitably follow: first, they would not cure their patients; secondly, they would have no patients to cure. For the most part I am accustomed to gain a knowledge of new remedies chiefly by reading or hearing the accounts given of them by others; and I feel that the weapon which I have learnt to use is that which, in my own hands at least, is most likely to do good service. In order to obtain a mercurial influence quickly, I use either blue pill, or inunction with blue ointment, or both together; and, for prolonged administration, the perchloride. Inunction is often useful for adults, but its especial value is in the case of young infants suffering from a combination of purulent ophthalmia and inherited syphilis. For them, the plan I prefer is to smear every day a little fresh ointment on a strip of flannel, about an inch and a half wide, which is buttoned round the abdomen, next the skin, and worn constantly. Mr Hutchinson is accustomed to have the ointment rubbed into the soles of the feet, the only part of an infant's skin on which it never produces irritation. To this there are no other objections than the trouble of protecting the hands of the rubber, and the ill-consequences which may follow if the protection should be incomplete. Together with the pill or the inunction, except in the case of infants, it is wise to employ a little opium to check griping or purgation; and the perchloride combines admirably with iron, or quinine, or arsenic, or with any two of them, and is generally more effective in combination than alone. To this armamentarium I

am beginning to add a new remedy which is of sufficiently good repute to deserve a trial—namely, Staub's chloro-albuminate for hypodermic injection; but I cannot yet speak of it from an experience large enough to form the foundation of an opinion. Calomel, with precautions and under conditions that will be described when discussing the diseases of the cornea, is often useful as a local application; but, given internally, it has no advantage over blue pill, and the calomel-vapour baths, so much extolled by my esteemed colleague, Mr. Henry Lee, have appeared to me to be somewhat uncertain in their operation, and, sometimes to be too energetic. For these reasons they fail to fulfil what I regard as essential to a good method of mercurial treatment—namely, that the surgeon should hold the reins of it in his hand. We are much indebted to Mr. Haynes Walton for the force and clearness with which he has pointed out the boundary between the remedial and the poisonous action of mercury; and this boundary the prescriber should never transgress. Save in the exceptional cases of idiosyncrasy, in which mercurial poisoning may be produced by a single moderate dose, there should be no such thing as a sore mouth resulting from treatment. The slightest line upon the gums indicates a point beyond which the medicine should not be pushed; and the highest art of administering mercury is to keep the patient, as it were, on the brink of this line, without permitting transgression of it. For this purpose the inexperienced practitioner must be content to feel his way; and the most experienced will constantly find that he can do little more. —*St. George's Hospital Reports*, *vol.* vii., *p.* 112.

72.—ON GLEETS.

By Berkeley Hill, Esq., Surgeon to University College Hospital.

To begin with the commonest cause of gleet, inflammatory patches, of which the anatomical conditions are as follows:— If the interior of the urethra be illuminated by the endoscope, it will be seen that the greater part of the mucous surface is pale-pink in colour, slightly shining from mucous moisture, but that at one part or more the colour is full red, sometimes purplish red. The red patches are less elastic than the natural tissue, and contract as the instrument is withdrawn, or yield as it is pushed down the canal less evenly than the healthy tissue. The chafing of the instrument over these inflamed areas causes a little oozing of blood, and when that is wiped off the surface looks rough or raw. When the affection has lasted some months the redness is much paler, and often streaky. The

most common position for these patches is the bulbous portion —that is, four and a half to six inches from the meatus externus, according to the length of the urethra. This, you recollect, is the usual situation of stricture. The extent of the inflamed surfaces may reach an inch, but is rarely more than half an inch, and is commonly less. Perhaps, also, most frequently the red patch is single, though now and then there is a patch in the fossa navicularis, or in the penile urethra between the fossa and the bulb. This condition of the urethra is the forerunner of organic stricture, for nothing more than time is needed to convert these patches into tough fibrous tissue that, by not yielding when the flow of urine expands the canal, constitutes stricture.

When the patient begins to describe his case, he tells you that he had clap some months, or even a year or two, before, but has never got quite rid of his discharge, notwithstanding that he has tried a great variety of remedies. Sometimes he will say he has been apparently well for a short time, but the discharge has begun again without any fresh exciting cause; meanwhile he has no pain, no difficulty in passing water, and no need to pass it oftener than usual, and the urine is clear and light-coloured. If the gleet be due to inflamed patches, they may generally be discovered without introducing the endoscope, which is always more or less painful to the patient and troublesome to the surgeon. Put the patient on his back, and introduce a bullet or olivary bougie or sound with slender graduated stem, of a size that will just pass the meatus without pain, and push it slowly along the urethra. As it reaches an inflamed spot there will be a slight resistance, and the patient will feel a smarting pain while the bullet passes over the patch, but when this is left behind the resistance and pain both cease. By reading the number of inches which have been introduced the situation of the inflamed spot can be at once ascertained. Continue the introduction of the bougie until the bladder is reached, noting any other resisting points, should they be met with. The bougie is next withdrawn, and the situation of the tender points is again announced as the bullet passes them in its journey outwards. The next step depends a good deal upon the amount of tenderness, and the degree of resistance the bullet experienced in going to and returning from the bladder, and on the aspect of the discharge. When the pain is pretty acute, the resistance very slight, and the discharge white and tolerably thick, there is probably more inflammatory congestion than induration of the mucous membrane, and it may be dispelled commonly by the following method. Take this bullet-ended catheter with graduated stem, and when the bulb has reached the inflamed spot inject through it two or three minims of a

strong solution of nitrate of silver (ten or twenty grains to the ounce of water) or of perchloride of iron, though I prefer silver. If there are more than one point of inflammation, inject those nearest the bladder first. Before doing this it is well to let the patient empty his bladder and to direct him to wait two or three hours after the injection before doing so again. The consequences of this application are rarely serious —seldom exceed a few minutes' sharp hot pain, and require no treatment beyond abstention from active exercise, such as cricket, riding on horseback, &c., for twenty-four hours. If the patient feels scalding, or notices a drop of blood on his shirt when he makes water, he should get into a warm hip-bath before he goes to bed, and take a few doses of simple saline during the next day or so. Usually, and when the injection answers best, the discharge increases for two or three days, and then diminishes—if it does not stop altogether—to less than it had been before the treatment was begun. A weak astringent injection should then be used in the ordinary manner for three or four days, when the caustic solution may be applied again as before. At the end of ten days the discharge is often reduced to a few shreds in the urine, and may be finally disposed of by several methods. If there is still a little cling or hitch as the bougie passes the spots that were before tender, there is probably some induration, and the passage of a steel sound, beginning at No. 10 and gradually increasing the size to No. 12 or 13, two or three times weekly for a fortnight, will complete the recovery. But if neither cling nor tenderness be left, the passage of sounds is rarely beneficial; but the introduction of a soluble bougie, such as this I hold in my hand, every evening on going to bed, is often beneficial. These bougies are six or seven inches long, round and smooth, and about the thickness of a No. 6 or 7 catheter, rather brittle when dry, but if dipped for a few seconds in boiling water become flexible and slippery so as to be easily introduced into the urethra. They consist of gelatine covered with mucilage in which is dissolved or suspended the medicament to be employed, such as sulphate of zinc, chloride of zinc, tannin, rhatany, &c.; others have opium or belladonna, either with or without the astringents. They are made in Paris, where they go by the name of "porte-rémède Reynal," and are sold by Roberts, of New Bond Street, and I dare say by other French chemists in this town. The patient passes one every night on going to bed, and ties over the penis a little waterproof hood to prevent part of the gelatine that is slowly dissolved from escaping out of the urethra and soiling his night-dress. By the morning the bougie has been absorbed. They may sometimes be introduced twice daily with advantage, but usually one every night is as

frequently as they can be borne. The patient should also take twenty or thirty grains of freshly powdered cubebs every day; and these applications commonly arrest the discharge completely. The general rule in inflammatory patches being, that the more the disease approaches simple congestion, without induration of the mucous membrane, the better will local astringents and specific medicines avail; while, on the other hand, when the surface has lost most of its congestion and new tissue has attained some development, specific medicines are of no value, and gradual dilatation is most serviceable, beginning with tapering-ended olivary bougies, which are the safest and least irritating. When the urethra is habituated to the flexible instruments, replace them with steel sounds, properly curved and gently handled. When there is new tissue we have really to deal with organic stricture—a wide stricture certainly, but one that needs only time and neglect to become a narrow and dangerous contraction. An American surgeon, Dr. Otis, of New York, has recently contrived a mode of treatment for these indurations, which he calls "strictures of wide calibre," which I have adopted in some cases with success—namely, where the canal has been dilated by instruments that reach the full normal size of the greater part of the canal, but are not sufficient to fairly stretch the bulbous part, which has naturally a greater calibre than the penile portion, and is the situation where these troublesome affections are usually placed. He introduces an instrument which, while it stretches the part concerned, also nicks or incises it slightly by a cutting edge, which is made to protrude against the tightened membrane. Here is an instrument Coxeter made for me, not exactly a copy of Dr. Otis's, but which performs the same operation in a different way; being the instrument known as Thompson's dilator, only stronger, with the addition of a shoulder-piece, underneath which a cutting edge is protruded. It is also extremely useful to divide strictures that are easily dilated, but which rapidly shrink back after the instrument is withdrawn. By keeping the part to be cut tightly stretched, the stricture cannot yield and allow the blade of the knife to pass by without cutting fairly through the narrowing. This is a difficulty not overcome by several otherwise effectual urethrotomes.

To return to the gleets. Sometimes, though not very commonly, the inflamed patches are elevated into irregular projections of granulations, which not only resist the passage of the bougie, but cause a roughish sensation and a slip to the fingers as the instrument passes over them. If looked at through the endoscope, they are seen to be prominent, uneven patches, which resist the approach of the endoscope tube, and, when exposed, appear as pale-yellowish or greyish masses, much less

yielding than the natural mucous membrane in their neighbourhood. The discharge from these is rarely coloured, is very scanty, and resembles gum water. They are said to produce, in time, an obstinately contracting tissue that causes much trouble. Certainly those which have fallen under my care have been extremely difficult to deal with. The methods I have found most satisfactory are the following. They are both no novelties, and one boasts a respectable antiquity. It is to pass a wax bougie, in size a No. 7 or 8, three inches of which have been previously dipped in melted cocoa butter in which various stimulants have been suspended, such as five to to ten grains of peroxide of mercury to the ounce of fat, or five grains of nitrate of silver. This is inserted into the urethra as far as the granulation patch to be acted on, so that the stimulant shall be brought well in contact with it. The bougie is left in the urethra from ten to fifteen minutes, till the cocoa-nut butter has melted, when the astringent remains in the urethra as the bougie is withdrawn. If this fails, as unfortunately it sometimes does, a more severe proceeding may be resorted to. About twenty drops of solution of nitrate of silver—thirty to forty grains to the ounce of water—may be thrown into the urethra from a syringe like this, and left there.

Another cause of gleet is inflammation of the glands and follicles along the floor and sides of the urethra, which sometimes remains long after the gonorrhœa itself has subsided. When the follicles attacked are situate in the anterior portion of the canal, rarely more than one or two follicles furnish a discharge; but if in the prostatic portion, several of the crypts there secrete a thin translucent fluid, which will be better considered separately. If the follicle can be got at readily, a slender silver wire—a catheter stylet, for example,—armed by dipping the end for a moment in melted nitrate of silver, may be run into the little follicle, of which the mouths—luckily for this purpose—usually open towards the meatus urinarius. This slight cauterisation has usually to be repeated two or three times before it quite stops the discharge; and is readily practised in the lacuna magna, just within the meatus, in the roof of the urethra, which is perhaps the commonest situation for gleet of the crypts or follicles. But if there is much difficulty in getting at the source of the discharge, which is solely due to the weeping of two or three such sinuses, it is better to let it alone, unless the patient is extremely anxious to have his gleet quite arrested, and prefers the inconvenience of treatment to that of being able to detect occasionally a shred or two of inspissated mucus in the urine. Unlike chronically inflamed patches on the wall of the urethra, these irritated crypts do not cause permanent thickening, nor are they apt,

like warts, to excite fresh inflammation of the urethra and to produce a contagious discharge. There is, so far as I know, only one accident to which they give rise—namely, the little sinus or duct may close, and the pent-up secretion gradually form a small elastic swelling, easily detected externally when in the penile part, which sometimes acutely inflames, and an abscess, the size of a hazel-nut, is produced, which ultimately opens into the urethra again, but before it does so may impede or arrest the flow of urine by its bulk.

Prostatic gleets.—A mucous or muco-purulent discharge from the prostatic part of the urethra may be caused—1. By extension of gonorrhœal inflammation along the urethra to that part. 2. By congestion and irritation of a sympathetic kind of the prostate body excited by masturbation, excessive coitus, stone in the bladder, piles, &c.

To begin with the first of the above. The prostatic urethra is most commonly affected in gonorrhœa by an acute inflammation of the mucous membrane, known as inflammation of the neck of the bladder; this, being an acute affection, does not properly come under our consideration here. But gonorrhœa also causes a gleety discharge from the prostate in the disorder known as *chronic prostatitis*. The discharge is whitish, scanty, only to be perceived at the meatus urinarius when several hours elapse between the acts of micturition, such as that between going to bed and rising in the morning. Shreds may always be detected in the urine. In a well-marked case the patient has recently had a gonorrhœa in which, as the free discharge, smarting, and chordee subside, a new series of symptoms commence. The patient complains that, while the urine flows, a sensation of heat extends along the whole urethra, often radiating towards the buttocks, but felt most severely at the neck of the bladder when micturition is over. Moreover, at other times he has dull pain at the perineum or near the anus, sense of fulness in the rectum—rather worse when lying down in bed at night than by day when moving about. When in bed the patient finds he must pass water twice or thrice before morning. The act of passing water is also characteristic of prostatic affection. Not uncommonly some seconds elapse before the urine appears when the patient essays to micturate, and usually a few drops of urine dribble from the urethra when the stream ceases, owing to the compressor muscles of the membranous part not performing their office of forcibly emptying the hinder part of the passage. The patient is often tired by less walking than usual, and a long walk generally excites the sensation of fulness or weight in the rectum. The finger passed into the rectum seldom detects any distinct alteration in the size of the prostate, though it may be somewhat

longer; it is generally slightly tender to the touch. The best evidence of this tenderness is obtained by passing a bullet-bougie or sound. If a flexible bougie is used it should be one that contains a leaden wire in its stem, so that, if necessary, the stem may be bent to an obtuse angle of about 135° at one inch from the point. The instrument traverses the urethra without causing pain until the bulbous part is passed; the patient then flinches, and the instrument is often grasped by spasm of the voluntary muscles surrounding the membranous part. In a few seconds, if moderate pressure be kept up, the instrument passes on a little further, sometimes to hitch again with increased pain to the patient, or, if it reaches the bladder, the resistance suddenly ceases, and the instrument causes pain even when the point has entered the bladder. In withdrawing the instrument, when the bullet is disengaged from the neck of the bladder, spasmodic contraction of the membranous part drives it out rapidly until the bullet is through the triangular ligament, where it lies quietly enough, and all pain ceases. When the prostate is swollen, a rigid instrument with angular bend, will often pass better than a flexible one, which cannot be readily directed. It will be stopped when it has entered the membranous portion, but, by rapidly lowering the shaft as soon as the beak has passed through the triangular ligament, the beak is raised against the roof of the urethra, and, surmounting the impediment of its progress lying in the floor of the prostatic part, enters the bladder. This tenderness of the prostatic and membranous parts, when the bougie passes through them, is always diagnostic of a prostatic affection, while the muco-purulent discharge and recent existence of gonorrhœa are diagnostic of inflammation, even should the pain and aching and altered stream in micturation be too slight to attract attention.

Next to treat the affection. Here begins the unsatisfactory part. There is no method yet discovered by which a gonorrhœal prostatitis may be cured *tuto, cito, et jucunde*. The patient is relieved of his affection rather by following a regimen that, by keeping away noxious influences, allows full scope to the curative power of nature. To this end the patient's diet should be carefully regulated; excess of every kind, and alcoholic drinks especially, be avoided, unless the enfeebled condition of the patient renders wine necessary as a stimulant—a state of affairs, in my opinion, seldom really present; but in this it is difficult to get your patient to agree with you. When really needed, one or two glasses per diem of light sherry, good claret, or even good port wine, are the best kinds to use in these affections. The bowels, if irregular, are best cleared by the daily draught of Friedrichshall water—half a tumblerful made

warm by adding hot water and taken into an empty stomach while dressing every morning. Purgation is as injurious as constipation, but regular evacuation is necessary. Regular walking exercise of moderate quantity, healthy mental employment, and abstinence from sexual intercourse and lascivious thoughts of all kinds, should be most rigidly practised. For medical treatment, I have found little benefit from drugs. If there is much pain and nocturnal irritation, a very mild anodyne suppository passed into the rectum at bedtime should be ordered —such as one-third of a grain of extract of belladonna, a quarter of a grain of hydrochlorate of morphia, one grain of camphor, and ten grains of cocoa butter, melted together and cast into a conical shape. If the repeated use of the morphia interferes with the action of the liver, an occasional dose of calomel with a little colocynth should be given. While the discharge is whitish or opaque, two or three drops of copaiba in frequent doses is often useful; and when the prostate has lost tenderness if pressed by the finger, one or two drops of tincture of cantharides, in plain water, four times in twenty-four hours, is also sometimes magical in its effect. A good formula for the copaiba is: copaiba, two minims; essence of cinnamon, twenty minims; mucilage, twenty minims; water, one ounce: four times daily. When all the pain and spasmodic twitching of the compressor muscles have passed away, cubebs, in moderate doses—say, ten grains four times daily,—is sometimes useful to check the secretion completely. But at this period local treatment becomes so clearly efficacious that I am not sure how far cubebs is serviceable, for I have not trusted to it alone. For *local treatment* I have most faith in the following:—When considerable pain is felt if the finger is introduced into the rectum, and the prostate feels large and soft, leeches are useful—that is, three or four applied by means of a leech-tube to the mucous membrane within the anus, or if the introduction of a foreign body causes pain, which is often the case, and the requisite skill be not at hand, twenty leeches applied to the perineum are very beneficial. When the prostatic tenderness has subsided, cool hip-baths for five minutes, morning and evening, beginning at 85° F., and gradually lowering the temperature to 50° F. by adding cold water, are useful. They may be continued several weeks with benefit. In continuous moderate counter-irritation, lauded by some surgeons in chronic prostatitis, I have no faith. I have used it over and over again; but I could never satisfy myself that the repeated application of small blisters to the perineum lessened the prostatitis. If it benefited the patient at all it did so by engaging his attention and satisfying him that "something was being done," while the really curative agents I have already

mentioned were slowly producing their effect. Counter-irritation by means of caustic solution of iodine is, I believe, useful when applied in the following way:—Paint the perineum, the genito-crural folds, and neighbouring parts of the thighs, so that the area is as large as half a square foot, and thus raise a considerable amount of irritation too great to allow the patient to walk about for some days. Such irritation I have known to remove all the symptoms in a few hours, except the gleet, and that to be in a fair way to depart. But this favourable result is by no means constantly obtained; hence I avoid counter-irritation till I have tried other means. In long-standing cases the condition of the prostate closely approaches that of the so-called "irritable" or "relaxed" prostate, and applications to be employed in that condition may be adopted for its cure.—*Lancet, Feb.* 13, 1875, *p.* 223.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

73.—ON THE PHYSIOLOGY OF MENSTRUATION.

By Dr. JOHN WILLIAMS, Assistant Obstetric Physician to University College Hospital.

Having traced the charges which take place in the uterus during its period, we are in a position to offer an explanation of the hitherto mysterious process named menstruation.

The source of the menstrual blood has been ascribed to the vagina, the cervix of the uterus, the Fallopian tubes, the ovary —one or all. Equally diverse have been the views held as to the manner of the flow of the blood, for it has been considered as a secretion, as a bleeding from vessels ruptured on the surface of the mucous membrane, as a bleeding from vessels opening in a valvular manner on the mucous surface, and as an oozing or perspiration from the orifices of the utricular glands.

All observers hitherto, except Pouchet, have studied the menstrual flow as a process complete in itself, and have consequently had recourse to simple congestion, or to prolonged erection, in order to explain the hemorrhage. Pouchet studied the subject from an entirely different stand-point, for he constructed a theory of menstruation (as far as the uterus itself was concerned) from the results of the examination of the discharge which appeared in the vagina at different periods of the month. From what I have stated already, it is evident that the menstrual flow is not a process complete in itself, but the terminal change only of a cycle of changes, which begins at the cessation of one menstrual flow, passes through the developmental changes of the mucous membrane of the uterus, and ends with the cessation of the flow next following. It is also evident that, important in this investigation as the examination of the menstrual discharge is, it alone cannot explain the changes which the uterus monthly undergoes, because a very great part of that discharge consists of the débris only of what once grew in an exuberant manner, and consequently can give but little indication of its source.

More recently Kundrat and Engalmann have studied the changes which take place in the uterus during the catamenia, and they have added considerably to our knowledge of the

subject. They, like all previous observers, consider the time of the catamenial flow as the period of uterine activity, but they add, that the period of activity of the organ occupies a longer time than was generally supposed, and that the period of uterine rest was so much shorter—that is, they believe that the uterus is active not only during the menstrual flow, but for some time before the flow has commenced, and after it has ceased, and that there is a period of rest about the middle of the intermenstrual interval. They also suggest that fatty degeneration of the mucous membrane is the cause of the hemorrhage, for having described the swelling which takes place in the membrane before the bleeding, they add, in reference to the fatty degeneration, "that these changes begin with the bleeding, and continue after it is certain. It is a question only in what relation they stand to the menstrual hemorrhage. On that point our anatomical investigations throw no light. Our idea, however, is that those changes in the cells develop themselves independently of the bleeding, nay, that they are the cause of it."

This is a great advance in the physiology of the uterus, but we are justified in advancing still further, and in affirming that there is no period of uterine rest, but that the organ is ever undergoing those changes which either make it a fit receptacle for the ovum when impregnated, or which prepare it to carry off the ovum when impregnation has failed. If any one stage of the monthly interval could be appropriately termed a period of uterine inactivity, that one would be the bleeding period, for then the mucous membrane undergoes fatty degeneration and disintegration; while this disintegration, however, is going on, the subjacent muscular wall is in a state of active proliferation for the formation of a new mucous membrane, so that in reality there is no period of uterine inactivity.

Again, we have met with fatty degeneration of the lining membrane in the two uteri in which menstruation was imminent, but in which it had not yet begun (Nos. 7 and 8). In neither of these uteri had hemorrhage taken place, and no extravasation of blood into the soft tissue could be discovered. The fatty change began near the inner orifice and on the surface, and proceeded over the whole of the organ as far as the muscular wall; so that the degenerative change preceded the hemorrhage, and was probably the cause of it. There is, I believe, another element besides the fatty change engaged in causing the hemorrhage, and that is muscular contraction of the uterus itself. Direct proof of uterine action taking place can during mensturation it is not possible to obtain, but that it does take place can hardly be doubted, because the cavity of the uterus when menstruation is over, though larger than usual, is smaller

than it would be after removal of its lining membrane had not contraction taken place; and because, in some of the uteri examined by me during the menstrual flow, the muscular wall was pale, though the mucous membrane, the surface immediately under the peritoneum, and the broad ligaments were greatly congested, the blood having been driven by contraction of the muscular wall to the superficial vessels. We know further that uterine action sets in during pregnancy when the placenta has undergone fatty degeneration, and it is fair to infer that the unimpregnated uterus acts in a similar manner when its mucous membrane, which in part forms the placenta, has undergone a similar change.

The contraction of the uterus drives the blood from the muscular wall into the mucous membrane; the vessels of this membrane having undergone fatty degeneration give way, and extravasation of blood results. This extravasation takes place always near the surface, for in that situation the degenerative change has most advanced.

The rush of blood into the vessels of the mucous membrane expels the contents of the glands, together with the greater part of their lining epithelium. Even simple passive congestion, when excessive, is enough to produce this effect, as was seen in the fourth uterus of the series. This occurs before the sanguineous flow makes its appearance, and accounts in part for the increased discharge of mucus which precedes the latter for some hours.

When hemorrhage has taken place into the membrane, it undergoes rapid disintegration, and becomes entirely removed. It is removed not in pieces, but cell by cell, the process beginning immediately within the inner orifice, and proceeding along the surface towards the fundus, and at the same time towards the muscular wall. In some the removal is completed in three or four days; in others it is not finished for seven or eight. By means of this disintegration, which affects the walls of the vessels as well as the tissue around, the former are opened, and hemorrhage takes place from them. This is Aveling's "*Denidation.*"

While this destructive process is going on in the mucous membrane, active proliferation takes place in the muscular wall immediately subjacent to it. This, like the disintegration, begins immediately within the inner orifice, and proceeds towards the fundus, and at the end of the third day after the cessation of the catamenia, the lower two-thirds of the body, and at the end of a week the whole of the body of the uterus is covered by a thin mucous membrane. This membrane is produced by proliferation of the elements of the muscular wall

of the organ, the muscular fibres producing the fusiform cells, the connective tissue the round cells, and the groups of round cells in the meshes formed by the muscular bundles, the glandular epithelium.

On the third day after the cessation of the flow the lower two-thirds of the body of the uterus is lined by columnar epithelium, and at the end of a week this lining is complete. It is produced probably by extension from the epithelial lining of the cervix; it is not impossible, however, that the epithelium of the tubular glands of the body of the uterus also contributes towards its formation. An abrupt distinction between the mucous membrane and the muscular wall appears first near the cervix about the tenth day after the cessation of the catamenial flow; it gradually extends towards the fundus, which it reaches a little before bleeding begins. At this time the membrane has reached the highest degree of development attainable by it in the unimpregnated uterus, and is in a fit condition to receive the impregnated ovum. This is Aveling's "*Nidation.*"

Failing impregnation, fatty degeneration, disintegration of the membrane, and hemorrhage set in, and in a few days the structure, which had been formed during the preceding three weeks, is carried off as sanguineous débris. Hemorrhage takes place from no part of the uterus except the cavity of the body.

Menstruation then is neither a congestion nor a species of erection, but a molecular disintegration of the mucous membrane of the body of the uterus, followed by hemorrhage. The increased quantity of blood found in the vessels of the uterus is determined there by the active processes going on in the organ, and is in no way allied to congestion. The flow of blood into the uterine vessels attains its maximum at the time when the proliferation is at its highest—that is, a short time before the catamenia appear. When fatty degeneration sets in the flow is suddenly reduced; when proliferation sets in actively again, the blood supply is increased, and continues gradually to be increased until the membrane has attained its full development, when the supply is again suddenly diminished, and the changes described take place, unless conception shall have occurred. In that case the membrane undergoes no fatty changes, but is further developed, and the supply of blood becomes regulated accordingly. These changes, however, form no part of those which take place monthly in the organ, and consequently do not come under consideration here.—*Obstetrical Journal, March*, 1875, *p.* 762.

74.—OVULATION AND MENSTRUATION.

By Dr. A. Dunbar Walker, London.

As German and Russian physiologists are reviving the idea (apparently claiming for themselves the origin of it) that menstruation is not necessarily connected with ovulation—the former being a periodic function of the uterus, the latter a constant function of the ovaries—it will be interesting for your readers to know, that this and similar facts now brought to light were clearly demonstrated thirty years ago by Dr. Ritchie, formerly of Glasgow, now resident in London.

In his papers published in the London Medical Gazette during 1843-45, he draws certain conclusions from over 100 dissections of the ovaries of females of all ages, and who had met their death while menstruation and pregnancy were in different stages.

Though written at a time when the profession was much agitated and interested about the subject, they seem to have been neglected by medical men in general; yet they have stood the test of time, and as our knowledge increases their accuracy becomes more apparent. The following are the points he brings fully out:—

1st. The Fallopian tubes are perfect in structure, and patent from birth, continuing so throughout life, being occupied in infancy and childhood by a tenacious glue-coloured mucus, which in the child-bearing period becomes a cream-coloured fluid similar to vaginal mucus. They are both oviducts and vasa ejaculatoria, their distal extremities are true receptacula ovorum.

2nd. The ovaries contain from earliest infancy numerous Graafian vesicles, in continual progression towards the circumference of the glands, which they penetrate previous to menstruation by circular-shaped capillary-sized pores; their development and rupture being entirely independent of menstruation. As early as the sixth year they are highly vascular; at the fourteenth they are found varying in size from a coriander seed to a small raisin. Their ova can be detected in the usual transparent granular fluid, and their coats are so elastic that their contents on their rupture may be projected to at least twelve inches, the contained ova being conducted along the Fallopian tubes to the uterus.

After menstruation has been established no change takes place in the manner of discharge of the ovisacs, only the vesicles are increased in bulk, vascularity, and organization, which causes remarkable subsequent changes. When the menses have ceased vesicles are still developed and burst up to

extreme old age, in a manner similar to what is observed in infancy and childhood.

3rd. In early infancy, extreme old age, and long continued organic disease, the ova are minute, transparent, and structureless cells; and in advanced childhood, soon after the critical age, and during pregnancy and lactation, they are more or less organized, larger, and in the latter state are often so well maturated, that about one-third of the renewed pregnancies of married women take place while they nurse.

4th. The coats and cavities of ruptured ovisacs assume the four following forms:—

(1.) Mechanical dyeing of the coats an inky black (corpora nigra); or yellow (called by Dr. Ritchie, corpora lutea, but which are entirely different from the bodies known as such to physiologists), formed by decomposed blood. The above conditions were found indifferently at all ages and states subsequently to puberty.

(2.) In addition to the presence of blood in their cavities, organic changes took place in the coats, consisting progressively of an increased vascularity, a thickening, a whitening of the colour, and finally a corrugation of their tissues, forming white bodies either soft or hard (corpora albidi). In every variety of uterine condition subsequent to the establishment of menstruation these were found, but never before it.

(3.) A secretion of an organised, yellow-coloured, brain-like granular matter, and differed—

(*a.*) As the cerebriform matter was connected with ruptured ovisacs of No. 1 form, having transparent pellicular coats, or with those of No. 2 form, having either their outer or inner coat thickened;

(*b.*) According as the granular matter was deposited external to the inner layer only, or to the two internal layers of the ovisac. These appearances were found in immediate connexion with the existence of menstruation, and during the first seven months of pregnancy.

(4.) A conversion of the forms Nos. 1 and 2, arising out of a higher and more perfect organization; found in unimpregnated and lactating females, in the period between the eighth and thirteenth months after conception. They consisted of red-coloured fibrous bodies with an external vascular portion enclosing an opaque film (corpora rubra).

5th. No specific distinction was found in the ovaries of women who had borne children and those of females who had not been gravid.

6th. The miliary-sized vesicles obtaining in the different forms of suppressed menstruation instead of bursting and being discharged when they reached the external surface of the

ovary, which was the rule, were seen sometimes to traverse a portion of the broad ligament, and occasionally to become solidified in this situation. A similar extrusion of corpora albida from the ovary to the broad ligament was also met with, and in both classes of cases a slender pedicular connexion of the bodies with the ovaries was in a few instances observable. In most cases of the examples of extruded vesicles here referred to, the Fallopian tubes were impervious, and in such cases the secretion of the ovaries of numerous transparent minute vesicles with fragile non-elastic coats, and the discharge of those, as appeared, into the abdomen, seemed to continue irrespective of the tubal obstruction.

7th. Menstruation depends on a periodical augmentation of power in the nerves and blood-vessels that supply the uterus, giving rise to the formation within the viscus of decidual vessels, which exude lymph and red globules, the latter being evacuated mixed with watery fluid, mucous matter, and some of the salts of the blood. Sanguineous discharges may come from the uterus, but are not necessarily of the normal menstrual kind, and are usually occasioned by whatever temporarily or more permanently impedes the venous circulation of the uterus.

8th. Though the catamenia are never regularly secreted without the Graafian vesicles attaining a high state of organization, yet it is not necessary that a Graafian vesicle burst at each menstrual period. The elimination of ova and the process of menstruation are correlative effects of the ovaries, and to suppose the rupture of the Graafian vesicles to be the cause of the menses is to mistake a frequent association and, to some extent, effect for a uniform cause.

9th. The principal use of menstruation is, in regard to the ovary, to provide an accessory by which maturation of its vesicles, the absorption of their peritoneal and tenacious coats, and their extension generally, may be promoted throughout the child-bearing period of life, and in reference to the uterus, to furnish a nidus within its walls, by which the ovum may be entangled, retained, and nourished.

10th. Menstruation may return for several periods without the rupture of a vesicle, but when a vesicle is ruptured, during its prevalence changes take place in the interior and coats of the ovisac, forming bodies called by Dr. Ritchie corpora menstrualia. Some of such bodies are primary, being formed exclusively under the influence of the congestive menstrual nisus; others are secondary, being transformations of primitive species, and are formed by reflex action on the still patent vessels of recently ruptured vesicles. If pregnancy be established a reflex vascular influence is set up towards the ovaries, and the

corpora menstrualia undergo fresh changes, assuming the forms described in Nos. 3 and 4 of the preceding 4th conclusion,

Any who wish to investigate this interesting subject would do well to study carefully Dr. Ritchie's papers, which are embodied in a book published by his son: (Ovarian Physiology and Pathology. Churchill and Sons.) The reader will find that the desire of the author has been to put facts before the profession, and not to draw conclusions to support any preconceived theory.—*Obstetrical Journal, October* 1874, *p.* 412.

75.—ON THE USE OF THE FORCEPS AT THE ROTUNDA LYING-IN HOSPITAL, DUBLIN.

By Dr. JOHNSTON, Master of the Hospital.

[The clinical report of the Rotunda Lying-in Hospital having been read by Dr. Johnston before the Obstetrical Society of Dublin, the president of the Society,]

Dr. LOMBE ATTHILL, remarked that Dr. Johnston's practice was so successful that they could hardly condemn recourse to it once in ten times, and nothing could exceed the beneficial results which Dr. Johnston had proved to have accrued. He would, however. be sorry, notwithstanding the favourable results detailed in the report, that the free use of the forceps should be promulgated among inexperienced people. What was quite safe in skilful hands might be very unsafe in the hands of an inexperienced practitioner. He was strongly in favour of the long double-curve forceps which Dr. Johnston was in the habit of using, although he knew many who considered the straight superior.

Dr. CRONYN had seen Dr. Johnston use the double-curve forceps when the os was not dilated more than the size of a halfpenny. The patient was a primipara, and on the occasion to which he referred Dr. Johnston used the instrument apparently with the greatest ease, and delivered the woman of a large child. For two or three hours previously the dilatation of the os had not advanced, though the pains were good—the labour was, in fact, proceeding very slowly. He (Dr. Cronyn) was forcibly impressed with the way in which the forceps had been used by Dr. Johnston. He was originally inclined to think that the use of the instrument was a hazardous proceeding, but after having seen it applied as he had stated he became a convert to it.

Dr. KIDD wished to know whether, in reference to the use of the forceps before the os was fully dilated, it had ever been

found impossible to deliver the child after the instrument had been applied?

Dr. JOHNSTON replied that in no one instance was the forceps applied and the child not delivered. As a proof of the advantage of the double-curve forceps, he would mention that within the last month a woman from Denbigh, North Wales, came under his care, having in a former confinement been delivered by means of perforation. He used the double-curve forceps, and after a considerable amount of dragging he delivered her. It would be difficult to conceive a child more twisted than hers was—so much so that he feared it would not live. It, however, left the hospital quite well with its mother. That was one of the results of the use of the double-curve forceps. Once a grip was obtained with one of these, it would never yield. In another case, that of a woman with her ninth child, there was a depression on the parietal bone of the child of $3\frac{1}{4}$ in by $1\frac{1}{4}$ in. That child also went out with its mother well on the eighth day. He believed he was nearly three-quarters of an hour delivering her.

Dr. KIDD thought this one of the most interesting matters that had been brought before the Society for a very long time. There was such an immense amount of matter contained in Dr. Johnston's report that he felt unable to grasp it, and therefore hesitated to speak with regard to it. In his own experience, he had sometimes tried to deliver the head with the forceps before the os was fully dilated, and he had many times succeeded in doing so. He had also succeeded in applying the forceps, and been obliged to give up the use of it, because of its slipping. The point he meant to raise was not in reference to the peculiar forceps used, whether straight or curved, because he did not think that so very material, but as to the amount of force it was necessary to use to draw a child from an undilated os uteri. If the os were dilatable, he knew they could, with a very moderate amount of force, effect delivery. But that was the very case in which probably it was not necessary to use the forceps or any artificial means of delivery. If the os was not dilated, if the membranes had ruptured very early, and they had a rigid os uteri, and applied the forceps—there, he thought, they would have to use an amount of force, which would very probably injure the patient. He knew, however, that Dr. Johnson had stated that where the os was rigid he made use of the ordinary means to counteract that rigidity. He (Dr. Kidd) confessed that, to his mind, the great difficulty to understand was the amount of rigidity that it was safe to attempt to overcome with the forceps. He had seen a great deal of force used sometimes with the forceps, more force than he thought was justifiable, and more than that to which he would like to have recourse.

Dr. M'Clintock said the all-important and salient feature of Dr. Johnston's able and elaborate paper was that bearing upon the use of the forceps before the full dilatation of the os uteri, and that, as it were, would open up and would constitute a remarkable epoch in the history of midwifery. It opened out a new era with regard to practice, because it was so much at variance with all the maxims, principles, treatment, and practice laid down by the great and acknowledged authorities in obstetrics. But they were not on that account to reject or repudiate it. Dr. Johnston stood in this very strong position—that he advocated a practice which he had largely tested and tried, and by which he was able to show most satisfactory and gratifying results. At the same time he (Dr. M'Clintock) must say that he was such an obstinate conservative that he thought Dr. Johnston's practice and results would go this far in his mind satisfactorily to show and demonstrate that long forceps might be applied with perfect safety to the mother and child under circumstances where formerly they would entirely have shrunk from using them. That was a great step and a great fact to establish, that under circumstances of a peculiarly pressing nature to the mother and child, to feel that they had recourse to forceps which might be resorted to with perfect safety and success to the two concerned. He fully admitted that, and agreed with Dr. Johnston, and acquiesced in his results in so far as that. Even though he did no more, that was a great step, and most important. With regard to the particular circumstances under which the forceps should be employed, where the os was only partially dilated, there, he thought, the rule should be laid down with more precision. They knew that the first stage of labour might be prolonged to great length with perfect safety, and in fact, impunity to the mother and child, and he felt satisfied himself that if there was any rigidity of the os uteri, there the use of the forceps would be a very hazardous proceeding. But in cases that sometimes occurred, where prolapse of the funis took place, or where any sudden emergency arose, calling for delivery to save the mother, if she was imperilled, or an attack of convulsions came on, then it was very comforting to know that they might resort to the expedient with safety and advantage. He could hardly, however, conceive a case of simply tedious labour where a resort to this expedient would be justifiable. It was one thing to say that the forceps had been used under such circumstances with safety, with great care certainly, in a few cases, and in most experienced hands, such as Dr. Johnston's; but to lay it down as a rule, or to attempt to lay down a rule that, because labour had been tedious in the first stage, resort to the forceps had followed, would be fraught

with danger, and if such a practice were acted upon by inexperienced or incapable practitioners or young men, it might be productive of very serious results.

Dr. JOHNSTON replied. With regard to what had fallen from Dr. Kidd as to the amount of force necessary to make the os yield, he could only say that, once the forceps were got in, of course it was not, as he told the students, like drawing a cork out of a wine bottle; but care and judgment in extraction must be used, until they gradually got the os expanded—and it was wonderful in how short a time the os would become fully expanded. Concerning what Dr. M'Clintock had observed as to the importance of using the forceps in the first stage, he (Dr. Johnston) must repeat to them what he had mentioned before, that it was in consequence of a case where there was early rupture of the membranes. Dr. M'Clintock had stated that the first stage might be continued with little danger. A case to which he had referred induced him to do so, and it was a case where, according to the old rule, a warm bath was used, and the patient given stimulating enema. When he again saw her he found that the os was not fully dilated though he could extend it. He delivered her with a forceps. On the third morning, however, she was found in a state of collapse, and died in half-an-hour. At the post-mortem examination they discovered a complete separation of the cervix from the body of the uterus. That one circumstance had induced him to make the bold step he had taken, and certainly he had no reason to repent of having done so.—*Medical Press and Circular, Jan.* 20, 1875, *p.* 49.

76.—INDUCTION OF PREMATURE LABOUR.

By JOHN C. LUCAS, Esq.

The operation for inducing premature delivery or abortion in the earlier months is effected either by directly acting upon the womb and its contents, or indirectly by secondary reflex irritation through the medium of the breast, larger bowel, &c. The measure most frequently had recourse to in the present day is that originally taught and practised by Hamilton in the beginning of this century. This operation—namely, of detaching the membranes—used to be performed rather roughly in those days by the forcible introduction of the digit through the cervix uteri, but modern obstetricians have improved upon Hamilton's method by taking care to avoid puncturing the bag of membranes by the careful introduction of a flexible instrument between the uterine wall and the membranes, without tearing through the latter.

In a case which not long ago came under my observation—that of an out-patient of the West London Hospital, who was a little less than eight months advanced in the gravid condition, in which case premature delivery was urgently demanded,—after getting the consent and preparing my patient, and placing her in the usual obstetric position, I employed a long flexible gum-elastic bougie, passing it in a spiral manner across the fundus, without puncturing the bag of waters. I left it *in situ*, and labour, as desired, was brought on within nine hours; both mother and infant did remarkably well, without any any evil consequences to either. The operation is by no means a difficult one, is perfectly free from danger to maternal structures, and not unfrequently saves many a patient from the perils of forceps, version, &c., and many more infants from death in utero or by the painful resort to embryotomy, by which the mother has to run the risks of post-partum hemorrhage, metritis, peritonitis, &c. Therefore the timely induction of labour before the full term, in properly selected cases, would tell materially upon the statistics of parturient mortality. —*Medical Times and Gazette, Nov.* 28, 1874, *p.* 602.

77.—ON THE USE OF THE TOW PESSARY.

By Dr. Edward Copeman, Senior Physician to the Norfolk and Norwich Hospital.

At a time when we are constantly introduced to new instruments of every description, all professing to be improvements upon those before employed (but which do not always come up to the mark of usefulness claimed for them by their inventors), it may be a relief to fall back for a change upon something of a more *simple* character. I think surgeons will, as a rule, admit that the more simple the construction of their instruments the more satisfactory is the use of them, provided only they prove equally effective, although this feeling has been sometimes carried to too great an extent, unless in very practised hands. For instance, the late Mr. Martineau was in the habit of using one lithotomy staff for patients of almost every age, and one gorget for almost all; and these he carried to the hospital in his coat-pocket—a strange contrast to the variety and multiplicity of the instruments now provided for the operation, and borne in handsome mahogany cases.

But the instrument to which I specially allude in this communication is the pessary, of which there is now such an infinite variety; perhaps proving that, where so many different ones are contrived, many of them have been found of little value. My experience of them certainly leads me to the con-

clusion that but few of them are to be depended upon, and that some are quite useless. The case to which I am about to refer was that of a patient of more than middle age, who applied for relief at the Norfolk and Norwich Hospital, and was under the care of Mr. Crosse. She had had complete prolapsus for a long time, and no kind of pessary was found to be of any use. I chanced one day to be in the ward when Mr. Crosse examined the patient, and he asked me whether I thought an operation he contemplated would be likely to afford relief. The uterus was quite extruded, and, when he returned it into the vagina, the folds of the vagina were so loose and redundant, that he proposed removing a considerable portion on each side, in the hope that, in healing, it might afford effectual support to the uterus and prevent its further extrusion. The matter was left open for further consideration; but I suggested meanwhile that he should reduce the uterus and plug the vagina with some tow which was lying at hand, covered at the top by, and partially enclosed in, a piece of linen greased on the outside to facilitate its introduction. This was effectually done, and, although nearly half a roll of tow was used, it produced no inconvenience either to the bladder or the bowel. It maintained the uterus in its place, and was renewed as often as appeared necessary for cleanliness. Soon the patient was enabled to renew it herself; and, after a week or two, she was discharged from the hospital and advised to continue the same plan. I heard of her some time afterwards, and ascertained that the uterus never came down now, and that she could even dispense with the tow pessary, except when over the wash-tub, at which times she *thought it prudent* to apply it. She had not been so well for years.

This was a remarkable case; the worst, in extent, of prolapsus I have ever seen, and certainly not amenable to any treatment by pessaries, as far as my experience guides me; indeed, almost every kind had been tried and failed. On reflecting upon it, I am inclined to the belief that a tow pessary might in many cases be used with success, and it has the merit of being incapable of doing injury to the parts with which it is in contact. It is easy of introduction; indeed, this patient soon learned to introduce it for herself. Being a compressible material, the tow would not keep the vaginal walls constantly on the stretch, like a solid body, but would rather allow them to contract gradually upon it, and thus prevent their losing their resilient power. The linen with which it is covered at the top and sides affords an easy means of withdrawing the tow for purposes of cleanliness, and the pressure which the tow exercises on the soft parts is equable, and so distributed that it causes no pain in any part with which it is in contact. More-

over, it is not liable to be displaced by any pressure or weight exerted upon it by the uterus itself or by muscular efforts in defæcation, for it clings, as it were, to the walls of the vagina; and this, combined with the resistance of the sphincter, effectually prevents it from being displaced. I am very sanguine in the opinion that a *tow pessary* will be found useful in various cases where pessaries are usually employed; but, at all events, I feel sure it will be found a most serviceable and effective means of removing the difficulties and annoyances of a *complete prolapsus of the uterus.—British Medical Journal, October* 24, 1874, *p.* 523.

78.—ON THE CONTAGIOUS NATURE OF PUERPERAL FEVER.

By the Editor of the Lancet.

[Puerperal fever is a term which embraces a number of diseases having different causes, symptoms, and anatomical lesions. One class of cases arises from contact with the poison of an acute specific disease, as typhus or erysipelas.]

Another class of cases is that which is due to absorption by the vagina of a poison introduced by the examining finger of the accoucheur. The poison in these cases may be the cadaveric or decomposing animal matter, such as the discharge from the generative organs of a patient suffering from puerperal fever: or it may be the contagion of an acute specific disease. There is a third class of diseases which is included under the term puerperal fever, which is generated within the body of the patient, the cause being decomposition and absorption of coagula or portions of the placenta retained in the uterus, or the breaking up and entrance into the circulation of a clot which has formed in the uterine vessels. The form of the disease depending on the introduction into the vagina or the formation within the body of a poison other than the acute specific contagion is not contagious in the sense that typhus fever and erysipelas are, but it is certain that it is not unfrequently communicated by the intervention of a third person, that person being the medical attendant. Numerous instances are on record of outbreaks of puerperal fever in which all or almost all the cases occurred in the practice of one man. Dr. Armstrong says that out of forty-three cases which occurred in Sunderland in 1813 forty happened in the practice of one surgeon and his assistant. Dr. Gordon observed, with reference to the epidemic which took place in Aberdeen in the year 1789-90, that the disease attacked such women only as were visited or delivered by a practitioner, or taken care of by a man

who had previously attended patients affected with the same disorder. Roberton states that from Dec. 3rd, 1830, to Jan. 4th, 1831, a midwife attended thirty patients for a public charity; sixteen of these were attacked with puerperal fever, and they all died. In the same month 380 women were delivered by other midwives for that institution, but none of the 380 suffered in the smallest degree. Evidence of this kind might easily be multiplied, but we have said enough to show that the disease is in some cases contagious in the sense typhus is, and that in all cases it is communicable by the accoucheur or midwife. And this is not to be wondered at, for we know how difficult—nay, how impossible it is for some time to remove from the hands which have been engaged in making a post-mortem examination the odour of the cadaver, even by the most abundant ablutions and the careful use of disinfectants. We know, also, what a small quantity of septic poison is sufficient to engender a fatal disease even in a healthy person; but in the puerperal woman the poison acts at a great advantage, because her system is in a more or less exhausted state after the parturient efforts, and it is engaged in throwing off waste products—the wasting from severe muscular action and from the involution going on in the uterus. Besides, the poison, when communicated by the examining finger, is introduced to a part capable of absorbing rapidly, and one which, at that time, is wounded, bruised, and sore from the mechanical violence to which it has been subjected. Under these circumstances the patient is peculiarly susceptible to the slightest contagion or inoculation. Again, practitioners of midwifery find it their duty frequently, during the first few days after labour, to examine the vaginal discharge. In this manner their hands become more or less tainted; and, if the patient be suffering from puerperal fever, this taint is sufficient, even after the most careful washing and use of disinfectants, to communicate the disease to a patient examined soon after.—*Lancet, Jan.* 23, 1875, *p.* 132.

79.—ON PUERPERAL FEVER.

By Dr. Robert J. Lee, Assistant Physician at the Hospital for Sick Children, Great Ormond Street.

[The question as to the contagious nature of puerperal fever has been much elucidated by the researches of Semmelweiss.]

The method of investigation pursued by Semmelweiss was much the same as that followed by Gordon, and the proposition he supported was, like his, that puerperal fever is a disease (essentially) produced by the introduction of a septic poison

into the system. Gordon, as we have seen, declined to express any opinion on what the poison might be; but Semmelweiss did not hesitate to state that it was generated in the foul organised substance which results from the decomposition of animal matter. The work does not contain any original contributions to the pathology of the disease, and in that respect, as an observer of pathological conditions, he appears to me to have been decidedly inferior to Gordon.

Semmelweiss argues his point somewhat in the following manner. "We see that the great lying-in institutions are singularly subject to occasional outbreaks of this disease, and the danger to puerperal women is very much greater in those institutions than in separate domiciles. In those hospitals where students are instructed, and are in the habit of coming to the wards, and to the examination of cases from the dissecting-room, the disease is more frequent and the mortality greater than when only midwives are admitted for instruction. To prove this, we have such and such a tabulated register of cases, which shows a mortality under one system of 10 per cent., as compared with 3½ in the other. In Vienna, before 1841, the mortality in the lying-in hospital was small, when compared with that of a few years later, when the hospital had been converted from its first intention to serve for the clinical instruction of students."

"To prove that the poison was generated in the process of decomposition, and might be conveyed by the hands of attendants, a case of cancer of the uterus in a pregnant woman was the cause of a dozen fatal cases in the same ward, and the probable means of conveyance of the poison were the sponges and other things employed by the nurses, or in the course of examination by the medical attendants. We had a case, too, of necrosis of a knee-joint, which was also the cause of some fatal cases. These were clearly established facts, and they point to the same conclusion." This is the nature of the argument, which is fairly well worked out. To show that the dissecting-room might be the source of danger, he makes the declaration:—"I myself was appointed for the second time to the clinical assistantship of the first *clinique*, and was in the habit of going into the wards after making explorations in the dead-room. The mortality in April and May was 18 per cent. and 12 per cent. respectively. During the four preceding months, I was only occasional assistant, and was not engaged in *post mortem* inquiries, nor was I obliged to examine the patients *seriatim* before the visits of the Professor. Look at the difference between the mortality in the two cases."

Then he goes on to show us from his tables that there is no connection between seasons of the year and the occurrence of

the fever; so that it could not be said in any way to depend on epidemic conditions of atmosphere or temperature. There is a great deal more in the way of collateral evidence adduced by Semmelweiss, but the main line of argument he pursued is thus broadly indicated. It was essentially based on statistics fairly arranged, without taking advantage of such data, and without overstraining them.

He did not neglect an important test of his views by ascertaining the effect on living animals of the artificial introduction of healthy pus into the circulation, thus proving that the symptoms could not be referred to such a cause as simple purulent infection.

I have said that Semmelweiss's work consists chiefly of a collection of observations made by himself, without direct reference to the opinions of others. He does not omit, however, to mention the views of some few whom he was led to regard as the representatives of scientific thought, both in his own country and abroad. In this part of his work, however, it must be acknowledged that he gives proofs of possessing very limited knowledge indeed of the literature of his subject, and we cannot feel surprised that he finds but little difficulty in disposing of his opponents to his own satisfaction.

He brings his arguments together into a condensed conclusion at the end of his treatise in brief and forcible language. "I have shown," he says, "above that the excess of mortality in the first lying-in *clinique* in comparison with that in the second was occasioned by putrid matter, which was introduced by the hand of the examiner. I have shown that, in October, 1847, the foul material of a foul cancer of the uterus produced puerperal fever. I have shown that, in November, 1847, a decomposing material from a carious knee-joint produced puerperal fever; how the fever was connected with the visits of the surgeons in one hospital in particular, and how the mortality during six years was reduced to less than one per cent. when all connection with the surgical wards was broken off. It was the finger of the surgeon that carried the poison in the latter case; it was the atmosphere in the case of the knee-joint, and the air and the foul linen together in the *clinique* at Pesth, where the infection spread in spite of the washing with chlorine-water."

It may be mentioned that he had adopted the use of chlorine-water with signally good results, and derived from this fact increased support to his views of the septic origin of the disease. —*British Medical Journal, March* 13, 1875, *p.* 338.

80.—ON THE LOCAL USE OF LIQ. FERRI PERCHLORIDI FORTIOR IN CANCEROUS ULCERATIONS OF THE UTERUS.

By Dr. Charles J. Gibb, Consulting Surgeon to the Newcastle Infirmary.

[In the advanced stage of cancer of the uterus the foul discharges make the case so loathsome that, in spite of the keenest feelings of pity, the surgeon is inclined to view the case as utterly hopeless, and to leave all manual treatment to the nurse.]

When we remember how much relief can be given to the worst symptoms of the most incurable cases of external cancers by operation, or other measures calculated to remove fungoid or sloughing surfaces or masses of the disease; how pain can thus be relieved, bleeding prevented, foul discharges moderated or made less disgusting in character,—it is not surprising that surgeons should strive to give similar relief to the worst cases of cancer of the womb, and be more or less successful in their efforts. From time to time I have tried the various local applications I have seen recommended, have made use of many caustics, been taught by painful experience that caustic potash or caustic potash and lime are unmanageable and too dangerous to the surrounding parts to be used with the freedom requisite to be of service, that the actual cautery is too fear-inspiring, that nitric acid and acid nitrate of mercury (which have to be used with great care) are inefficient, and that lunar caustic and powders or points of alum are useless as caustics.

About two years ago I had occasion to dilate the uterus in a very obstinate case of menorrhagia, proceeding from large vascular granulations in the cavity of the enlarged organ. The strongest Pharmacopœial solution of the perchloride of iron (being, in fact, iron dissolved in pure acid) was injected into the open uterine cavity, and a piece of sponge soaked in the solution left there for twenty-four hours. This treatment was perfectly successful; and I viewed with surprise the efficient way in which the soft and vascular growths were destroyed, whilst the normal structures of the uterus and vagina were but little inconvenienced, and certainly not in the least eroded. Since that time I have been accustomed to use this solution in many cases of cancer of the uterus; and I jotted down the histories of the following four cases, being cases of cancer in which I used it in my consulting rooms during one week.

Case 1.—Mrs. B., aged thirty-six; a shopkeeper; married five years; no children. Was a strong, powerful woman until fourteen months ago, when she was seized with menorrhagia, followed by the foul sanious discharges and other symptoms of

cancerous ulceration. She came to my offices six weeks ago, anæmic to the last degree from almost constant hemorrhage and putrid discharge. On examination, the mouth and neck of the uterus were found destroyed, and their place occupied by a large, deep, sloughing, cancerous sore. The body of the uterus felt greatly enlarged and as hard as a cricket-ball, whilst the vagina was quite free from disease. Profuse hemorrhage attended the examination. The sore was filled with cotton-wool soaked in the solution of the perchloride, and the vagina stuffed with tow. She came from a distance by rail, and was ordered to remove with her fingers, or allow the lady who accompanied her to withdraw, the stuffing of tow next morning, and trust to the injections of zinc and alum to wash away the cotton-wool; and appropriate blood-making and aperient medicines were prescribed. On her second visit she expressed herself as much stronger, very little bleeding having taken place during the week. The application of the perchloride was repeated, and I did not see her for the next ten days, in consequence of a severe attack of pain compelling her to remain in bed. The sore was much healthier in appearance, there had been very little bleeding, and the discharge had become scanty and semi-purulent in appearance, without any of the old foul, putrid smell. She was, however, very feeble, and made the journey with great difficulty. Instead of placing the cotton-wool soaked in the perchloride over the sore, I elevated her breech, half filled the vagina with the solution for a couple of minutes, then sucked it up with a syringe, and left a plug of tow in the vagina, to be removed next day. The improvement was marked on her fourth visit; and on her sixth I found there had only been a little bleeding once during the week, whilst forcing away a very costive motion. The ulcer was perceptibly smaller and free from slough, the circumference of the vagina around it having contracted considerably. A small quantity of yellow, oil-like pus lay in the vagina, but the examination still caused the ulcer to bleed slightly. The ulcer was again bathed with the strong perchloride, and she returned home, expressing herself as twice as strong as when she first called upon me, and very much relieved from the local misery.

Case 2.—Mrs. R., aged thirty-six, an innkeeper, with several children, the last seven years old. Began to have menorrhagia and the ordinary symptoms of cancer of the womb nearly a year ago. Commenced attending my offices four months ago. Was found to have a large, soft, bleeding epithelioma, covering the swollen and apparently destroyed vaginal part of the uterus, and extending along the front wall of the vagina to within an inch and a half of the orifice of the

urethra. She came in a cab, and her linen was drenched with blood. She was excessively anæmic from daily hemorrhage, and was evidently in the last stage of the disease, the sore bleeding on the least examination. A large piece of cotton wool was soaked in the perchloride, placed over the disease, and the vagina stuffed with tow. On her second visit, a week afterwards, the hemorrhage had almost ceased, the sanious putrid discharge was much lessened, and, although there was little change to be seen in the appearance of the sore, the finger felt it to be less fungoid and pultaceous in consistence, and less blood followed the examination. I may here remark that the bleeding fungoid sores were so extensive as to make it utterly impossible to use any speculum, and the oiled fingers of myself and assistant had to be used to open the vagina and make the necessary examinations and applications. The same examination was made weekly during the nine succeeding visits, by which time she had regained much of her lost strength, walking a considerable distance to my rooms, and experiencing but little pain or inconvenience except in passing urine and fæces. The hemorrhage had ceased after the third application; the foul sanious discharge had given place to a scanty oil-like purulent matter without smell; the fungoid vaginal sore was healed, or rather converted into a thick nodulated gristly cicatricial substance, covered with a smooth membrane, whilst the deepest part—that corresponding to the uterus—alone presented a chink-like ulcerated surface. It was difficult to see or to reach the deepest part on account of the remarkable contraction that had taken place in the calibre of the vagina, which, from being very capacious and soft, admitting several fingers, had become changed to a rigid tube that would scarcely allow more than one finger to pass along the upper part of the canal. At this period some of her children became ill of fever, and she did not visit me for six weeks, having gone through much fatigue in the nursing of them. On examining her this week, on her return, I found she was again suffering from a recurrence of the hemorrhage, consequent, as she asserted, upon the menstrual flow, and I also found that the disease had again opened out the deepest part of the cicatrix, and formed an irregular foul ulcer nearly the size of a crown-piece. The front part of the cicatrix remained in much the same condition; I covered the sore with woo soaked in the perchloride, and warned her against such negligent attendance in future.

Case 3.—Mrs. B., aged forty-six, a stout, healthy-looking lady from the country, the mother of several children, called upon me about a year ago, having slight discharge and bleedings in the intervals between her monthly periods, as well as

excessive monthly flow. Her other symptoms were so slight that her husband (who was also a patient) had difficulty in persuading her to see me. The mouth and neck of the uterus were found red and raw-looking, bleeding on the slightest touch, also hard and considerably enlarged, and there was an ulcerated crack at the orifice of the organ. She attended my rooms once a week for about two months. Lunar caustic was applied at first, but, producing little change, the perchloride was used, for a few times with such good effect that, considering herself quite well, she did not return to see me until now, when she tells me the bleedings have returned lately, and she feels a heavy, uncomfortable weight in the uterine region. On examination the whole organ is found greatly enlarged and very hard, being evidently infiltrated with scirrhus disease. The old ulcer is again opened, bleeds freely on examination, and there is considerable discharge. The perchloride was applied.

Case 4.—Mrs. F., aged sixty-nine, from the sea coast, consulted me about eight years ago, for a discharge, occasional menorrhagia, and the uncomfortable bearing down and other symptoms indicative of uterine mischief. The uterus was found atrophied, and the os and neck almost destroyed by a chronic cancroid ulcer, in appearance like to lupus, the whole case reminding me strongly of a similar condition of the breast, which I have often seen in old people to continue in a chronic state for years. Potassa fusa and other caustics and injections were used for more than a year, the result being the total destruction of the vaginal part of the uterus, and the formation of a deep sulcus there, which, after remaining healed for some months, again opened out, and has ever since compelled her to attend my rooms two or three times a year for a month or two together. A slight bloody discharge is the only symptom that now tells her the cicatrix has given way, and of this discharge she has the greatest dread. Lunar caustic or nitric acid, with the use of injections, were generally successful after a time in healing the sore, or rather crack, in the cicatrix. I am now accustomed, however, to fill the wound with a small piece of wool dipped in the perchloride and retaining it there, for the first day, by a plug of tow in the vagina, and find it frequently, in spite of the use of injections, to stick in the place until her next visit, a week afterwards, when I remove it. I find the perchloride to be by far the most effectual means of healing the scar when it cracks and bleeds, and on this occasion I made the usual application.

In reviewing the above cases, I have to remark that since the first case was committed to paper the patient has visited me twice, and on each occasion has reported large losses of

blood, although on examination the sore looks clean and the discharge remains a thick brownish pus quite devoid of smell. What remains of the uterus is infiltrated with cancer, and although the treatment has greatly relieved the most distressing symptoms, it is evident that a fatal termination cannot be long delayed. Indeed, I have seen that where the form of cancer is hard and embraces the whole of the uterus, the destruction of the enlarged organ often takes place by a rapid disintegration, attended with alarming gushes of blood, and all that can be done only lengthens the downward path and makes it less foul and painful. It is different with that class of cases of which the second is a good example. Here there was as pure an epithelioma as is met with in the uterus, spreading over the adjoining surfaces of the vagina, and not infiltrating or running deeply into their structures, but throwing out surfacewards exuberant vascular fungoid granulations, quickly renewed as the older parts sloughed away. Into this soft albuminoid structure the acid solution of iron sinks, destroys, and disinfects, and, strong as it is, only hardens and tans, but does not in the least destroy the healthy mucous membrane of the vagina. A few applications of the cotton-wool soaked in the solution suffice to clear away the diseased growth. Reparative efforts are then made by the comparatively healthy structures underneath, and the further applications appear to hasten cicatrisation as well as eradicate the remains of the disease. In one case very similar to the second case, the lady has now been quite well for some months, and the resulting cicatrix, when she ceased to attend upon me, had so narrowed the upper third of the vagina that the finger could not pass along it, and was so thick, hard, and tuberculated that I could not resist coming to the conclusion that in the process of cure a large amount of albuminoid matter had exuded into and become solidified in the structures surrounding the disease. Whether the thickening and solidification of the cicatrix and immediately adjoining parts is what naturally takes place in this region when epithelial cancer is destroyed by other caustics, I have no experience to know; possibly it may partially result from the action of the solution left for so long a time on the highly vascular structures supporting the diseased growth—structures that have been so long accustomed to throw into the diseased mass the large supply of albuminoid food necessary for its support. In another case of apparent cure, where the epithelial disease was confined to the uterine structure, I did not observe this condition of the cicatrix; and it may be that the presence of so much connective tissue in the vaginal wall is the cause, as well as the seat, of this peculiar formation, reminding me, as it does, of a bad case of keloid growth in the skin, or the hard irregular cicatrix

of a bad burn. The course of cancer in the womb is sometimes so rapid from the quick disorganisation and sloughing of the uterus, and the sufferings of the patient are so great, that it is impossible, in a dispensary practice like mine, to see such cases as often as necessary, and to follow them out satisfactorily, or to persuade a sensitive woman to have repeated applications of an agent which does not give immediate or permanent relief. In such cases, indeed, no remedies can be of much avail. It is where the disease is purely epithelial, or chronic or rodent in character, and confined to the surface, that the treatment I have described does most good, and, as I have said, appears sometimes to cure even bad cases. The application of the perchloride rarely causes pain. On four or five occasions a patient, on returning home, has been confined to bed for a few days, and, in one of the successful cases, for upwards of a fortnight, in consequence of a severe colic-like pain in the region of the uterus, lower abdomen, and back. I am inclined to think that the wool had been over-saturated in the perchloride in such cases, as it has occasionally happened that the solution has flowed from the vagina over the vulva after the patient has left my offices, and those parts been blistered and painfully excoriated as a conquence. On this account I am now very careful to wash away with a syringe all discharges from the surface of the cancer, to raise the breech of the patient to prevent any overflow of the solution over the vulva, and, after applying the perchloride, to suck up with a sponge from out of the bottom of the vagina any superabundant solution which a slight pressure on the saturated wool over the sore may cause to flow out; after that, to retain the wool in its place by a loose plug of tow in the vagina, and, lastly, dry and oil the vulva before the patient rises from the couch.

I have always used the strongest Pharmacopœial solution undiluted, as I have only used it to secure a caustic action. At first I applied it on pieces of sponge or lint, but finally found cotton-wool to answer best, as it sucks up any quantity that may be required, parts with it readily, and can be moulded into any form so as to fill a cavity, or cover over and adhere to any growth. It has happened occasionally that I have found the cotton-wool still adherent over the sore a week or more after its application, and, when removed, it is always a black or chocolate-coloured mass, frequently quite solid from the quantity of blood or albuminous matter absorbed into its meshes and clotted therein—indeed, one patient gravely told me she had passed a solid brown egg a few days after one of her visits. No doubt it was the hardened wool, although she declared she had cleared out the vagina the day after her visit.

I have kept no record of the cases I have treated with the perchloride; but as I have generally had six or eight under treament at one time, I must have used it in twenty or thirty cases, and its beneficial influence has been so marked that I would strongly recommend its trial in suitable cases.—*Lancet, Dec.* 12, 1874, *p.* 830.

81.—EXTIRPATION OF A FIBRO-CYSTIC TUMOUR OF THE UTERUS, WITH THE UTERUS AND ITS APPENDAGES.

By Dr. E. H. Trenholme, Professor of Midwifery, Montreal.

The patient, first seen by me in October, 1873, is a medium-sized, well-developed, dark-complexioned, healthy, unmarried woman of thirty-four years. She is spare of flesh, has a good appetite, and sleeps well. The tumour from which she seeks to be relieved was first recognised in September, 1870, after an attack of what was called "inflammation of the bladder and gravel." It grew steadily and slowly for the next year, when it rapidly increased in size, but gave her no inconvenience till February, 1872, when she had a slight attack of menorrhagia. Hemorrhage again occurred in May, also at two or three times during the year, the last of which was in July, 1873. Patient enjoys life, and has little trouble, except from the weight of the tumour, and at the menstrual periods, when there is a good deal of flatulence and pain, which passes off as soon as the flow is established.

The tumour fills the abdominal cavity, is firm to the touch, and the parietes over it are freely movable. There appears to be a fluid cyst at the upper part, between the umbilicus and ensiform cartilage, where there is much tenderness. Percussion gives a tympanitic note in either lumbar region, but over the growth the note is uniformly dull. Measurements: at the level of umbilicus, 41 in.; from ensiform cartilage to umbilicus, 9 in.; umbilicus to pubis, 11 in.; right anterior superior spinous process to umbilicus, 10½ in.; left ditto, 9½ in. The os uteri could not be felt or seen per vaginam. The vagina reached above the the brim of the pelvis in the direction of the left cotyloid cavity. The right ovary could be felt on the left side of the tumour on a level with the umbilicus. The bladder when distended with urine could be traced out over the tumour in the median line, and extending about three inches above the pubis.

Diagnosis.—From the ascertained facts stated, it was concluded that it was a fibro-cystic tumour of the uterus, probably springing out of the posterior and lateral part of the body of the organ.

Prognosis.—As suppuration had not supervened, and no dangerous symptoms were manifested, it was thought that life might be enjoyed for months to come; and, although the

patient was anxious and ready to undergo the operation of excision of the tumour and uterus, such a course was not deemed warrantable, and she was sent home to enjoy herself till life became a burden, or some serious symptom demanding the operation presented itself.

Progressive symptoms.—Patient went on well as usual up to the end of January, 1874, when she noticed for the first time an offensive vaginal discharge, which gradually increased in quantity up to the end of February, when she had what she calls a congestive chill, that lasted for half an hour. This was followed by a high fever, which lasted about three hours, when a profuse perspiration supervened, which lasted ten hours, and, finally, this was followed by a severe headache that lasted a week.

From this time there has been increased pain during menstruation, continuous and offensive vaginal discharge, night-sweats, and a bad odour and taste in the mouth. After the attack the patient's strength and flesh rapidly diminished, so that by the end of a fortnight she was reduced almost to a skeleton. Towards the end of April and during May she recovered sufficient strength to come to Montreal on the 28th of the latter month. She now weighed 137 lb. The abdominal measurements were as follows:—Around the body, on a level with the umbilicus, 41½ in.; ensiform cartilage to umbilicus, 10 in.; umbilicus to pubis, 12 in.; right anterior superior spinous process to umbilicus, 12 in.; left ditto, 11 in. Compared with the size of the tumour in October last, there is on an average an increase of about one inch in each of the measurements.

From the date of admission till 12th June, the day of the operation, attention was directed to the general condition of the patient. Effervescing carbonate of lithia was administered with satisfactory results in restoring the urine to its normal condition, as it had been scanty and high-coloured for some days past.

Operation.—Anæsthesia was induced by chloroform and continued by sulphuric ether. An exploring incision to the extent of about six inches was made in the linea alba, with the customary precautions. Each point of hemorrhage was at once controlled by Péan's forceps or fine hempen carbolised ligatures. An attempt was made to puncture a tumour at a point where indistinct fluctuation seemed to exist, and to draw off the fluid, which failed. The incision was then extended upwards to within an inch of the pubis, care being taken to avoid injuring the bladder; the incision was then extended downwards about three inches to one side and above the umbilicus, making the extent of incision about fourteen inches. The adhesions and vascular connections, which were very extensive on the posterior and lower part of the tumour (among

which was an attachment of the bowel to the extent of about ten inches), were chiefly divided by the actual cautery and knife, every point of hemorrhage being secured by fine hempen ligatures cut off close to the knot. The uterine ligaments were divided by the hot iron, but this did not prevent persistent hemorrhage from the right ovarian artery, which was ligated with considerable difficulty. The tumour, being sufficiently freed to be raised out of the pelvis, was then carefully separated from the neck of the uterus, and the latter enclosed in the wire écraseur, and then divided a little above the wire, at about one inch from the os, by the knife. The tumour being removed, the cavities of the abdomen and pelvis were carefully sponged out with carbolised water. The edges of the incision were brought together by eight deep interrupted sutures, and the same number of horsehair sutures superficially. The pedicle was transfixed by two steel needles crosswise of the abdomen, one passing through the centre of the pedicle, and the other, a figure of eight suture, embracing the edges of the incision and upper edge of the pedicle in its grasp. Carbolised lint was placed under the ends of the needles and over the wound. The abdomen was supported by broad strips of adhesive plaster passed over it from side to side. Over this was placed cotton wool, and all was secured *in situ* by a broad flannel roller.

At the completion of the operation, which occupied two hours and a quarter, alarming symptoms of collapse intervened, from which she rallied on the exhibition of stimulants. The patient was then moved to her bed, and a quarter of a grain of morphia given to secure rest, but its effect was to cause vomiting and so much gastric irritation that it was not repeated. Subsequently aconite was given for the purpose of checking the emesis, and encouraging the action of the skin, which it satisfactorily accomplished. At 10 p.m. the skin being moist, and pulse quick and full, veratrum viride was given to control the heart's action. It acted tolerably well, but had to be omitted as it induced severe vomiting. On the second day the bowels began to be distended with flatus. There was considerable nausea; tincture of capsicum relieved this very effectually. In the evening flatus escaped freely per anum. I heed hardly say that the urine was drawn off every four or five hours, up to the evening of the third day, when she passed it without difficulty; the bowels also moved quite freely. On the fourth day she was doing well, but troubled with sore throat and tendency to cough (the result of a cold caught the day before the operation), for which nux vomica was given with satisfactory results. On the sixth day she felt so well that she said she "would like to be out of bed." On the evening of the ninth day the pedicle

separated leaving a deep cicatrix, which gradually filled up. From this time up to the twentieth day, she was troubled with accumulations of pockets of pus in the parietes of the abdomen, around the cavity of the pedicle. These pockets of pus generally communicated freely with ulcers, but on those days that such was not the case there was a good deal of constitutional disturbance and fever. On the thirty-second day the patient walked across her room, and on the thirty-fifth day walked down town to Victoria-square, some 250 or 300 yards. She weighed 102 lb., being 32½ lb. less than before the operation. From this date forward she gained flesh and strength rapidly, and is now (15th October) free from pains or any other infirmity. Has gained 19½ lb. since the 1st August, and enjoys life without hindrance.

The tumour weighs 16 lb., and springs out from the centre of the back part of the body of the uterus, somewhat to the left side. A No. 10 catheter can be passed through the os, and then through a fistulous opening communicating with a large cyst near the centre of the growth, but rather nearer the upper border. This cyst, when fresh, was full of pus, and holds about 32 oz. The growth throughout is of a dense fibroid charncter, and inseparably connected with the body of the uterus.—*Lancet, Nov.* 14, 1874, *p.* 691.

82.—ON DIAGNOSIS OF TUMOURS OF THE BREAST.

By Thomas Bryant, Esq., Surgeon to Guy's Hospital.

Excluding acute and inflammatory diseases, tumours of the breast may be divided into three classes:—

1. Cancers; 2. Adenomas; 3. Cysts (simple or complicated). The first and second are of common occurrence; the third is an intermediate class, and are comparatively rare.

Cancer of the breast is a disease of adult life, and usually occurs at the age of forty and upwards. In looking over the notes of some 500 cases which have come under my notice, I was struck with the fact that cancer attacks unmarried women earlier in life than it does married women. The cause probably is that in the unmarried the breast ceases to be active at an earlier age than in the married. The period at which the breasts are most prone to the attack of cancer is that of functional decline.

Cancer attacks the breast in two forms—as a general infiltration and in the tuberous form. In the infiltrating variety the elements are thrown out around and between the ducts, separating the ducts from each other, and putting them as it were on the stretch. If the infiltration is at no great distance

from the nipple, this tension of the ducts draws the nipple down, causing what is called retraction. The cancer-cells go on multiplying, and as the disease progresses the cancer disseminates its elements into all the tissues with which it comes in contact. In this particular it differs from all other morbid processes. In other growths the natural tissues are not invaded, —they are simply pushed on one side. If the tumour is very large, the skin may be stretched to the point of ulceration, yet it remains freely movable over the tumour, and so far healthy that if the tumour be enucleated the parts become restored to their normal condition. But it is otherwise in cancer. As the cancer elements increase they spread to the subcutaneous tissue, and finally the skin itself becomes infiltrated, and is no longer movable over the tumour. If the tumour be not removed, the skin after a time loses its vitality and ulcerates. So with the tissues beneath the gland; each in turn becomes infiltrated with the elements of cancer—cellular tissue, muscles, and bone. When this occurs there is a fixedness about the tumour; the breast can no longer be moved over the pectoral muscle. In these cases it is often doubtful whether a surgeon is justified in operating or not. But no case should be allowed to advance to this stage; the rule of surgery is to excise as soon as the diagnosis is made out. You often hear reference made to the axillary glands being affected in cancer. One of the characteristics of cancer is its tendency to spread to distant parts. How the elements spread is not in all cases clearly made out; but in the case of the lymphatic glands it is well ascertained that the cancer-cells are taken up by the lymphatic vessels, and are thus conveyed to the glands. In the same way cancer-cells may be propagated by means of the systemic circulation—a contingency which should make us always very guarded in our prognosis.

The tuberous form of cancer differs from the infiltrating in that it is more circumscribed. It has, however, the same clinical course, and will lead to the same results—infiltration of skin, muscles, &c.

Adenoma generally occurs in the breasts of young healthy women during their period of developmental perfection. Among married women it often occurs in those who are suckling. It usually grows slowly, and as it enlarges it pushes the breast aside; it never infiltrates it. It may grow to a great size, and stretch the skin even to the point of rupture; but the skin is never infiltrated, nor the tissues beneath. The tumour is encapsuled, and usually movable, and can be readily turned out. It is never associated with any secondary glandular enlargement. Although the breast is the most common seat of adenoma, the disease may appear in other parts.—*Medical Times and Gazette, Feb.* 27, 1875, *p.* 223.

ADDENDA.

83.—SALICYLIC ACID, THE NEW DISINFECTANT.

By the EDITOR of the MEDICAL TIMES AND GAZETTE.

In the disinfectant now rapidly coming into use—viz., salicylic acid—we have a good example of a substance investigated in the interests of pure science being suddenly turned to active and important purposes. The best account of the acid and its applications which we have yet seen is contained in a pamphlet by Dr. Squibb—perhaps the most learned of American pharmacists,—being the substance of a paper read by him before the New York Academy of Medicine. In this the author deals with the past history, and indicates the great future in store for substances of a disinfectant kind, which are at the same time harmless, or nearly so, when swallowed internally.

Beginning with the first investigation of salicin, Dr. Squibb goes on to say, salicin is a glucoside, or neutral vegetable principle discovered by Leroux in 1830, in the bark of some species of willow *(Salix)*, whence its name; and it was afterwards found in various species of poplar, and in other trees and plants. Salicin was early investigated by Piria, who gave an elaborate account of its derivatives, and among these of salicylic acid. This acid was soon after prepared by Löwig and Weidmann from the flowers of *Spiræa ulmaria;* and later, a research by Professor Procter, of Philadelphia, showed that our oil of wintergreen, *Gaultheria procumbens*, was really a salicylous ether; and from this source salicylic acid was obtained by Cahours. Gerhardt, Ettling, and others contributed to the researches by which the properties and reactions of salicylic acid were accurately determined, and its composition fixed; but as yet it was but a chemical curiosity, whose potential possibilities were quite unknown. By-and-by it came to be known that this acid possessed great powers as an antiferment and disinfectant. It was more sought after, and a new method of preparing it—the one still in use—was looked for, and found in the so-called carbolic acid. And it is a very curious circumstance that a substance of well and long-established character as an antiferment should have offered to these chemists a molecular constitution so well adapted to be

broken up into a still more powerful antiferment; for there is no relation whatever, either in composition, or chemical or physical properties, between carbolic acid and salicylic acid, except in their effects as antiferments, and the two may, as far as present knowledge extends, accomplish these effects by similar, or by altogether different reactions. The agent which the German chemists selected to resolve the molecule of phenol into other molecules, one of which should be salicylic acid, was dry carbonic acid or carbonic anhydride, as it is called in the new chemistry. Thus, from the action of carbonic acid on carbolic acid, salicylic acid is produced. It appears that where phenol or cresol, and perhaps others of the class of phenols, are combined with an alkali metal such as sodium or potassium, thus forming phenol-sodium (often called phenate of soda) for example, and well-dried carbonic anhydride is passed through the dry powder of phenol-sodium heated to 100° to 250 C. = 212° to 482° F., the reaction occurs which produces salicylate of sodium and other compounds. The salicylate of sodium thus formed is dissolved in water and decomposed by hydrochloric acid, which, uniting with the sodium by superior affinity, sets free the salicylic acid in the form of small crystals. These crystals are washed and re-crystallised from a hot solution, and when dried form a crystalline powder of a light brown colour, somewhat resembling in colour the powder of pale cinchona bark (Kolbe). This is unbleached salicylic acid, and is probably pure enough for almost all, if not for all, the purposes to which the acid is at present applied to practical uses. The small proportion of colouring matter which it contains in this condition is held by it with great tenacity, and the further processes by which it may be obtained of various shades up to whiteness are so difficult, troublesome, and expensive that they more than double the cost of production. This bleaching may be accomplished in various ways to a certain extent, but, to get the acid quite white, Kolbe recommends that it be converted into an ether, and this ether be again decomposed. The acid imported from Germany at very high prices is occasionally quite white; but most of that sold at the more moderate prices of two or three dollars per ounce is of various degrees of whiteness, up to a very light cream colour with a reddish tinge. These varying shades of colour seem to show that bleaching processes, more or less effective, have been used with all the acid yet imported. Hence the entirely natural or entirely unbleached acid has not, so far as known, been yet used to any considerable extent and it is a mere reasoning process, based upon the quantity and qualities of the colouring matter in the well-made unbleached acid, by which it is inferred that for most, if not for all of its present

uses, this is as good as the more or less bleached product. If the well-made unbleached acid be found to subserve all the useful purposes to which the substance may be applicable; and if the substance should even in moderate degree realise the expectations of its importance in the arts, and in medicine, as indicated by all European authorities, the process of Kolbe will make it practically attainable in the necessary quantities at a far lower cost; whilst without some such process it would be of very limited use to mankind, whatever might be its powers. Whether bleached or unbleached, the acid is in minute broken acicular crystals, which give it the appearance of a granular powder, soft and smooth under the pestle or knife, but somewhat rough or resinous when rubbed between the fingers. This powder is odourless and nearly tastelesss. It has, however, a sweetish and astringent aftertaste, with slight acridity in the fauces, but none in the mouth; and though tasteless, it leaves a disposition or inclination to expectorate which continues for some time.

It is practically insoluble in cold water, but is very soluble in hot water; and the water of a hot solution retains when cold, in proportion to its coldness, from about one part in 250, to one part in 500 of the solution. The presence of various neutral salts in small proportion in the water renders it far more soluble. Up to this time phosphate of sodium seems to have been chiefly used in Germany to render it more soluble in water for medicinal purposes, and it is said that three parts of phosphate of sodium will render one part of the acid easily soluble in fifty parts of water. It is much more soluble in alcohol and ether than in water. It melts at about 125° C. = 257° F., and sublimes at about 200° C. = 392° F. In common with other similar acids, it forms salts with the principal bases, but these seem thus far to be difficult to make, and their effects have not been investigated.

It is used for medical and surgical purposes either dry or in solution. When used dry it is sprinkled on to wounds, ulcers, or dressings in the form of very fine powder, in very small quantities, either simply powdered, or mixed in various proportions with some diluent, such as starch. When used in simple solution either for spraying surfaces, or for washes or gargles, it is used in tepid solution of about one part to 300 parts of water. Where stronger solutions are required for washes, gargles, or to moisten dressings, one part of the acid and three parts of phosphate of sodium to fifty parts of water have been used. When applied to wounds it appears immediately in the urine.

Its alleged advantages over all other antiseptics are—first, that it is far more powerful and effective in smaller quantities;

and secondly, that it is, in all quantities necessary for complete effectiveness, entirely devoid of irritant action upon the living tissues. It is not caustic nor corrosive in any quantity, and never produces inflammation. In large quantities it may be irritant and painful, but yet rarely surpasses a stimulant effect, while it appears to be quite neutral in the very small quantities which are yet thoroughly effective; thirdly, it is said to reach and prevent processes of decomposition which are beyond the reach of all other antiseptics or antiferments. These processes are of two kinds—namely, vital, or those in which living organisms have an important part, such as that produced by yeast and many of those which occur in putrefaction; and chemical, or those which occur independent of vitality, as the production of the volatile oils in mustard and bitter almonds, the effect of diastase, &c. Now, while carbolic acid and other antiferments are azymotic, or completely arrest or prevent fermentations of the first kind, they are powerless with the chemical processes. Salicylic acid is said to be more effective with the vital ferments, and equally effective with the chemical.

Fourthly, in quantities said to be thoroughly effective, it is entirely odourless and tasteless, and harmless, whilst it has no poisonous effect in any reasonable quantity.

It prevents or arrests the souring of worts, washes, and beers of the brewers, and prevents or arrests the putrefactive agencies which are so troublesome and destructive to the glue manufacturers; and these and similar trades have thus far seemed to be its principal consumers. Separate portions of fresh milk set aside to become sour, one to which 0·04 per cent. of salicylic acid was added soured thirty-six hours later than the other. Urine thus protected was on the third day still clear, and free from ammoniacal odour.

Varying proportions of the acid added to accurately measured separate portions of sweet milk, and these carefully observed afterwards until they sour—or, by the use of meat-juice instead of milk, observed closely for signs of putrefaction—would offer good indications of the quantities required to arrest these varieties of fermentation.

Professor Thiersch, of Leipzig, used it upon contused and incised wounds, and in operations, with excellent general results, destroying the fetid odour of cancerous surfaces, and pyæmic ulcerations. To such uses this writer would add the suggestion that for washing out the cavities of the abdomen and chest after those operations which tend so strongly to septicæmia, solutions of salicylic acid would seem to offer very great advantages should it prove to be as bland and unirritating as it is stated to be, and yet so effective.

In this country, salicylic acid has not been as yet much used; but it has, we understand, been introduced by Mr. Callender at St. Bartholomew's, so that we may hope before long to hear his experience of it. Those who may desire to institute investigations with it for themselves, may obtain a supply of the pure bleached acid from MM. Domeier and Sons, of Basinghall Street.—*Medical Times and Gazette, April* 24, 1875, *p.* 444.

84.—NOTES OF IODATE OF CALCIUM AS A DISINFECTANT AND ANTISEPTIC.

By S. W. Moore, Esq., Lecturer on Physiological Chemistry at St. George's Hospital.

The above compound is of recent introduction, and consequently but little known and used: it is important to accumulate facts concerning any new bodies, that their true nature may be accurately determined. My attention was drawn to iodate of calcium, in a paper in the Chemical News, by E. Sonstadt, in which he details how wonderfully it acted in preventing and arresting decomposition in wine, meat, eggs, and other readily putrescible substances; he also believes that it may be utilised as a drug in the arrest of septic matter (germs?) and conditions, as cholera, typhus, typhoid, and scarlet fevers. He was unable as a layman to put to the test his theories; I therefore gave this substance a trial, having first tested its powers on inert organic matter.

Reichardt (*Arch. Pharm.*) gives the following methods of preparation: If iodine is added to a solution of calcium or sodium hypochlorite, iodic acid is at once formed. So also if potassium iodide is substituted for free iodine in the above reaction, calcium iodate begins to crystallise out, and by evaporation a considerable quantity of this salt may be obtained. If precipitates containing iodine are boiled with excess of soda, the liquid filtered, calcium hypochlorite added to the filtrate, and then hydrochloric acid, a precipitate of calcium iodate at once forms. From the potassium salt thus obtained free iodic acid may be prepared by decomposing the crystals by means of sulphuric acid.

The salt used in my preliminary experiments I obtained by neutralising the iodic acid with carbonate of lime and evaporating to dryness. The salt behaves chemically as is usual with iodates; it contains six atoms of water of crystallisation, its formula being $Ca\,2\,IO_3, 6\,H_2O$, and gives off oxygen and iodine when heated. In my latter researches, to save trouble, the salt has been obtained from Messrs. Hopkin and Williams, Cross-street, Hatton-garden.

Experiment 1.—Definite quantities of urine were taken (10 c.c.) and exposed to a limited portion of air in test-tubes, varying weights of calcium iodate were added, ranging from 0·01 grm. to 0·2 grm., and the change noted daily; a similar quantity of the same sample of urine was left without addition to compare with the prepared ones.

On the fifth day those portions of urine treated with the iodate were nearly odourless, except for a faint urinous smell, while the sample of original urine was were mouldy and slightly ammoniacal.

On the eighth day the samples with the larger quantities of iodate were of a deep-brown colour, and smelt strongly of free iodine; those with the lesser proportions were unchanged; while the original urine was very mouldy and somewhat more odorous.

On the tenth day all the samples contained free iodine, but were otherwise free from unpleasant odour; while the sample of original urine was very offensive.

Experiment 2.—To 50 c.c. of fresh milk in an open dish 0·2 grm. of calcium iodate was added, and a similar quantity of the same sample of milk was also set aside untouched.

On the third day the pure milk had become solid, but no change had taken place in the sample treated with the iodate, save the separation of the cream with a slightly sour odour.

On the sixth day the original milk was covered with blue mould, and had a fœtid disgusting odour; the iodate sample was a little mouldy, but had not curdled—it was, however slightly offensive.

On the eighth day the iodate sample was curdled and offensive.

Experiment 3.—Two samples, of 50 c.c. each, of fresh urine were exposed to the air in open vessels; one was treated with the iodate, the other left untouched. Both samples remained unaltered on the third day; on the sixth day the treated sample assumed a darker colour, but the original urine was the same in appearance and odour as when passed; on the eighth day, finding that the original urine was unchanged, except for a very little blue mould, I made enquiries respecting the patient from whom it was obtained, and found that he was taking syrupus ferri iodidi. On applying suitable tests indine was demonstrated in the urine, which seems to account for its stability.

Experiment.—A rotten egg was divided, and a portion treated with calcium iodate, by simply sprinkling over its surface 0·2 grm. of the powdered salt.

On the third day the egg had lost the bad odour which it possessed when broken; on the sixth day it still remained inodorous, and at the edges was drying.

On the eighth day it was dry, horny, and inodorous, and has remained in that condition since.

Experiment 5.—Some fœtid decomposing albuminous fluid drawn from a hydatid cyst some months previously was treated with the salt; at the end of ten days it was nearly deodorised; it would have been a difficult matter to have recognised it as a portion of the fluid from which it was taken.

These results point to the conclusion that iodate of calcium is certainly opposed to the development of chemical decomposition in organic fluids; but how does it prevent these changes? Either by virtue of its own inherent power or by the development of free iodine by decomposition, as seen in the samples of urine. We know that the haloid elements are all more or less disinfectants; but iodine from its high price, and bromine from its corrosive properties, have not received so much attention in this direction as has chlorine.

The iodine in the natural urine of Experiment 3 seems to have greatly influenced its stability; may not the beneficial influence of iodide of potassium in syphilis be due to the antagonism of iodine and septic matter?

It now became necessary to test the influence of this body, the iodate of calcium, on the living organism; I therefore gave it in suitable cases to my patients at the London Temperance Hospital, Gower-street.

Case 1.—S. C., a case of indolent ulcer of the breast around the nipple, with a purulent discharge of bad odour. A powder consisting of half a dram of iodate of calcium to one ounce of starch-powder was ordered to be dusted on the affected part.

Under this treatment the discharge became inodorous, and the wound assumed a healthy appearance; but the shooting pains in the breast were so severe that the application had to be discontinued.

Case 2.—J. R., æt. 49, a labourer, admitted with large rodent specific ulcers, occupying nearly the whole space between ankle and knee on the tibial surface of his left leg. They were recurrent, and had existed for four months on this occasion, Iodide of potassium was ordered internally, and charcoal poultices to correct the fœtor of the ulcers.

On the eighth day after admission he gave evidence of an attack of erysipelas. He was put on milk diet, with large doses of perchloride of iron. His pulse was 140; temperature, 104·2°; both pulse and temperature remained at this high standard, and the temperature once rose to 105·2°. His leg became œdematous, the integument round the ulcers assumed a sloughy appearance; his tongue was brown, dry, and cracked;

the blush was spreading upwards to the trunk; and with his pulse at 120 and his temperature at 103° F. I administered, on the sixteenth day from his admission, two grains of iodate of calcium to be taken twice daily.

On the day following he declared himself almost free from pain; his appetite was improved, his pulse had sunk to 116, and his temperature to 101·8°. The administration of the drug was continued as directed; the general improvement in condition progressed; and the pulse and temperature continued steadily to decrease until the twenty-fifth day after admission, when they became normal.

Case 3.—H. H., æt. 19, admitted with chronic abscess of the back, with copious purulent discharge, and some pain. On the twenty-fifth day after admission one grain of the iodate of calcium was ordered thrice daily: a marked improvement followed; the discharge lessened in quantity, and became sanious rather than purulent.

Case 4.—C. T., æt. 46, admitted with a large indolent ulcer on back of right calf of seven years' standing. The muscles were exposed, and their action could be plainly seen on moving the foot.

A fly blister was applied to the ulcer, and subsequently charcoal poultices. It was, however, determined to try the iodate as an application with the poultices instead of charcoal; the fœtor was overcome to a considerable extent, but not so completely as with charcoal; but it gave rise, as in a previous case, to considerable pain, and had therefore to be discontinued. It was ordered internally after this in two-grain doses three times a day. A marked improvement followed the administration; the discharge lessened in quantity and lost its offensive odour, the granulation assumed a healthy appearance, and the ulcer gradually but surely healed.

Case 5.—E. L., æt. 52, labourer, admitted suffering from disease of the tarsal bones. It was intended to remove the anterior part of the foot by Chopart's operation; but on the day previous to that fixed for the operation to take place erysipelas was developed in the limb. This malady progressed so rapidly, and so affected the patient, that his life was dispaired of; his pulse rose to 140 and his temperature to 104·8°; the limb was swollen to twice its natural size, was œdematous, and the skin inclined to slough at certain parts; his inguinal glands were affected, and the course of the lymphatics inflamed. He became delirous, and remained unconscious for five days.

In the midst of this condition I ordered him four grains of the iodate three times daily. He immediately improved, became conscious, said the medicine revived him, his pulse

and temperature sank, the œdema subsided, appetite improved, and a general indication of returning vigour presented itself.

So marvellous was the change effected by this drug, that it has certainly never been equalled in my experience by any other medicament.

We gather, then, from these cases, though they be few, that the iodate of calcium, though an efficient local application, produces too much pain for the comfort of the patient; but that in cases in which it has been administered internally it has invariably improved the tone of the system to such a degree that the pulse and temperature have uniformly fallen to the normal standard. Some experiments were commenced to ascertain the bearing this drug had on the elimination of waste products in the urine; but from inaccuracies in collecting this fluid, owing to the unconscious state of the patient, they had to be abandoned. This matter is, however, in hand, and good results are hoped for. It must be remembered that in all these cases alcohol has been dispensed with in the treatment, and that the drug tested has been given in its pure and simple form.—*St. George's Hospital Reports, vol.* vii., 1875, *p.* 227.

85.—A NEW METHOD OF ADMINISTERING IODINE.

M. P. Collas describes, in the Bulletin Gén. de Thérap. of March 30, a new method of administering this remedy. On account of its strongly irritant action upon the organs with which it comes in contact, iodine is rarely employed in a free state. It must be dissolved in alcohol, and administered with a certain degree of caution. In truth, the tincture should be given with a strongly alcoholic wine, to prevent precipitation upon the walls of the stomach, which would irritate them and infallibly produce vomiting. Moreover, the tincture is of variable composition, for with time the iodine reacts little by little upon the elements of the alcohol, and there is then produced hydriodic acid and hydriodic ether. The attempt has been made to associate iodine with some organic matter capable, by its own re-solution, of delivering up iodine to the economy, as, for example, the iodide of starch. But this preparation is of variable composition—a grave inconvenience to the physician—and, moreover, its taste is rather disagreeable. Pills of iodised albumen present the advantage that the iodine is combined in a constant and known proportion. The iodine is completely masked, and its presence can only be recognised by destruction of the organic matter. This albumen is prepared by agitating actively an albuminous solution with iodine in very fine powder, or in solution in some appropriate vehicle. The mixture is at first highly coloured, blackish brown, but this

colour gradually disappears after several hours of ccntact, and the preparation strikes a violet colour with starch. The product is then desiccated under gentle heat in an air bath, when it may be made into a pill mass. The dose is so arranged that each pill shall contain five milligrammes of iodine. The experiments at the Hospital Beaujon, by Prof. Dolbeau, have shown that iodine thus prepared has no bad effects whatever. The pills, in the dose of five or six per day, act rapidly in the resolution of an hypertrophy of the thyroid gland. Iodised albumen seems to have the efficacy of cod-liver oil. It has been administered in cases of chronic osteitis, ganglionic engorgement, strumous keratitis, and in two cases of Pott's Disease with congestive abscesses. It may be continued for several weeks without gastric derangement or other inconvenience.—*Practitioner, Dec.* 1874, *p.* 438.

86.—THE ANTALGIC PROPERTIES OF ESSENCE OF MINT.

In a paper read before the Société de Thérapeutique, Dr. Delioux de Savignac points out that the essence of mint exerts a special influence on the sensory nerves, which diminishes the abnormal vivacity of their reactions when these become exalted into painful affections. It is comparable in this respect to chloroform, ether, and camphor. Though its high price will prevent its being extensively used in the pure state as an anti-neuralgic and anti-rheumatic, it may be employed in alcoholic solution as an application in the form of liniment, and camphor, chloroform, and laudanum may be added to it with advantage in various cases. Amongst special cases referred to, Dr. Savignac states that it has been found extremely useful in removing the itching and pain of pruritus; in alleviating, when employed in the form of injections of the leaves, the miseries of vulvo-vaginal hyperæsthesia, vaginismus, and neuralgias of the head and face; which are best treated by taking a small ball of wool of the size of a nut, which has been made to imbibe a few drops of the essence, and rubbing the painful part with it gently: it is then covered with a larger piece of wool, and the whole is kept in position for a few minutes with the palm of the hand. The success of these external applications of the essence of mint in neuralgias of the face and head, and even in cases of congestive cephalalgia, has been both prompt and permanent. He admits, however, that the cause of the pain must be local for the cure to be permanent, since if it be dependent upon hysteria, or be connected with intermittent fever or with gastric derangement, the primary cause must be dealt with by appropriate therapeutical means. The remedy seems to have been long known in China. Intermuscular and paren-

chymatous neuralgias do not yield to its action very readily, but resist it, as indeed they do that of opium and belladonna; for these he has tried hypodermic injections with success, the formula used being — Hydrochlorate of morphia, 1½ grain; hydrolate of mint, 140 minims; alcoholate of mint, 15 minims. Mix.—(Gazette Médicale.)—*Practitioner, Dec.* 1874, *p.* 435.

87.—THE THERAPEUTIC VALUE OF IODIDE OF POTASSIUM.

By Dr. James Lawrie, Glasgow.

This medicine has been accredited with many modes of action: thus, in struma as an alterative, in asthma as a sedative, and in diphtheria as an antidote. To all these titles it may have a claim which different observers may think fairly borne out; but certainly the one distinct and indisputable action of iodide of potassium which I have noticed, is that of *stimulating the mucous membranes;* thereby influencing their action and promoting their secretions. Thus, as the results of its use, there are pain and sense of fulness across the eyes; increased secretion from the nares, mouth, fauces, and bronchi; leucorrhœa and menorrhagia are greatly aggravated; and in persons very susceptible of its influence diarrhœa is induced, not so much of a cathartic as of a dysenteric kind; that is, rather an increase of mucus with tenesmus than of serum with catharsis.

In a person suffering from an attack of chronic winter cough, the first symptoms are great difficulty in breathing, amounting to a sense of suffocation; hard, dry, racking cough, which the patient says he cannot subdue; while he expresses a belief that relief would be obtained if something could be brought up. The suffocation complained of has been attributed to a swollen state of the air-passages, obstructing the respiration; but there is a fair probability that the dry congested condition of the membranes is unfavourable to the interchange of gases requisite for blood-aëration, and the situation of the patient such that, however he may fill his lungs, his sufferings remain unrelieved. Whatever the actual state of matters at this point, certain it is, that as soon as expectoration sets in, the breathing is improved; and, although the disease has by no means gone, the patient is so far better. Many hours of severe suffering may be obviated by taking advantage of the power of iodide of potassium to restore and promote the secretion of the bronchial membranes, thereby greatly relieving the congested blood-vessels, producing comparative tranquillity of breathing, and getting the patient over the first stage of the disease much sooner than

he otherwise would. This, however, is possibly not its only value. For, here again, however opinions may differ as to the cause of the emphysema which from an early period exists in these cases, no one can have witnessed the severe and straining cough at the onset of the attack, without feeling that it is at least possible for either dilatation of the air-cells or rupture of the tissue of the lung to take place—complications much less likely to occur, so far as the cough is concerned, when the sputum has been rendered easier of expectoration and the irritability of the congested membranes removed by free secretion. It is further to be remarked that the action of the iodide of potassium changes the purulent character of the sputa in chronic bronchitis to a much healthier appearance. From this view of its operation, it follows, as a matter of course, that when free secretion of mucus has set in the medicine should be used with caution or altogether abandoned; and, therefore, when in the treatment of bronchitis—capillary or chronic—moist *râles* are fairly established, the further management of the case should be on the principle of preventing a too abundant secretion, at the same time employing such means as may assist expectoration and maintain the strength.

In asthma, iodide of potassium is recognised as a valuable medicine. Here the explanation of its action generally given, is that of a sedative relieving bronchial spasm; evidence of the presence of spasm being found in the wheezing and whistling sounds heard in auscultation. Either of these sounds, however, fairly suggests the question, how far a fit of asthma is dependent on, or, at all events, greatly aggravated by, an abnormally dry condition of the mucous membranes, acting as in the diseases already mentioned, which is relieved by the iodide restoring the secretion.

In diphtheria, iodide of potassium is looked upon by many practitioners as the best remedy we possess. Here its alterative and sedative actions are laid aside, and we have it doing duty as an antidote to the diphtheritic poison; although, so far as can be seen, it exercises no new influence. In this disease, while there is free secretion from the nares, the breathing and cough-sounds are usually not very alarming, nor is respiration greatly impeded. It is not till the nares become dry—and doubtless the pharyngeal, laryngeal, and tracheal secretions diminished—that the formation of false membrane proceeds with fatal rapidity; hence, it does not seem too much to assume, so long as an iodide can keep up these secretions in such profusion as to prevent them from remaining on the parts sufficiently long to undergo membranous change, so long will its action be beneficial. The idea of an antidote might be more satisfactory; but it cannot be substantiated; nor does this view

of its action afford any indication as to what extent the medicine should be given; whereas, by paying attention to the degree of influence exerted upon the mucous secretions, the dose and frequency of administration may fairly be ascertained; if not, indeed, the knowledge acquired as to whether or not it is doing any good.

Without at present entering into a consideration of the influence of iodide of potassium on digestion and assimilation —the real sources of its so-called alterative power—I may state as my conviction, that in all the various manifestations of struma, &c., where this medicine is of service it acts, so far as the iodine is concerned, in stimulating the mucous membrane of the stomach and duodenum—possibly, by sympathetic action, the liver and pancreas also—to increased secretion, whilst its alkaline base tends to promote the digestion of fat and starch.

For the dose no absolute rule can be laid down, because in few respects, indeed, do constitutions and temperaments differ more than in the relative irritability of the mucous membranes, and, consequently, the power of iodine to influence their action. Persons of the bilious temperament usually resist its power to a wonderful degree, whilst in those of the lymphatic, sanguineous, and, above all, the nervous, a few doses of two grains each will often suffice to cause coryza, ptyalism, pharyngeal irritation, and cough. In such diseases as diphtheria, the object should be to produce its influence as rapidly as possible, whilst in others, as struma, small doses long continued are preferable.—*British Medical Journal, Jan.* 2, 1875, *p.* 8.

88.—ON THE ANTAGONISM BETWEEN INFUSION OF TEA AND MECONATE OF MORPHIA.

By Dr. John Hughes Bennett, Chairman of the Committee of the British Medical Association to investigate the Antagonism of Medicines.

In the autumn of 1869, I received a letter from Professor Sewell of Quebec, directing my attention to the influence of tea as an antidote to poisoning by opium. He refers to a case of his published in the Lancet for July 1865 or 1866, and says: "As I consider the case a most important, showing the wonderful power of green tea, not only in poisoning by opium, but also in that by alcohol in the coma of fever, and probably in puerperal convulsions, and in other cases of absorption of urea, I give you the case from memory. Mrs. H., aged 34 (or

thereabouts), wife of a medical man, had suffered for years with, as I understood, something like angina, for which she had consulted almost all the physicians in Europe, yourself, I think, among the rest. The only relief she ever got was from chloroform inhalations. On one occasion, when suffering from one of her attacks, I assisted her husband in administering three pounds of this fluid, which was continued uninterruptedly till the whole three pounds were expended. On the occasion of the last attack, which she had in this city, she felt the paroxysm coming on about 4.30 p.m.; and, between this hour and 11.30 the same night, she took two drachms of Battley's sedative solution of opium every half-hour, or fourteen drachms of the medicine in seven hours. Between half-past eleven and twelve, she had a convulsion-fit; I saw her a few minutes afterwards, and found her in the following condition: coma perfect; pupil contracted to a pin's point; perfectly cold up to the hips and elbows; face drawn and cadaverous; pulse imperceptible; *respiration two in three minutes.* This state of things is verified by one of my colleagues, who considered the case hopeless, and allowed me to administer what I pleased, saying she had not ten minutes to live. In the meantime, I had prepared the strongest possible infusion of green tea, and shortly after twelve I administered, *per rectum*, half-a-pint, my friend and I watching the result. In twenty-five minutes, the pulse at the wrist became perceptible; the face was less pale; and she *breathed six times in the minute*, instead of twice in three minutes. The same quantity of tea was then given, also by injection; and, to make a long story short, at 4 a.m., four hours after the commencement of the attack, she addressed me by name, saying, 'she could not see me, but that she recognised my voice;' at 8 a.m., she was out of danger. I have since had three cases of poisoning by alcohol in children, aged one year, five years, and six years. In the two latter, the coma was complete, but all were restored to consciousness in an hour or less. Will you, if you have the opportunity, give this remedy a trial in all cases of coma caused by an empoisoned state of the blood?"

It was in consequence of the above letter, that I directed so much pains to be taken in the investigation of this subject by the Committee; and, although far from complete, it will, I trust, be regarded by the profession as no unimportant contribution to the inquiry. I especially regret that ill health, and the consequent resignation of my chair, should have prevented my prosecuting, as was my intention, this matter thoroughly in the clinical wards.—*British Medical Journal, Dec.* 19, 1874, *p.* 771.

89.—ON THE LOCAL USE OF TANNIN.

By Philip Miall, Esq., Surgeon to the Bradford Infirmary.

Mr. Llewellyn Thomas writes to the British Medical Journal of October 24th on concentrated solution of tannin as a styptic. I have used it for some years, as a topical application, in various diseases, though rather as an astringent than a styptic. To prepare it of full strength, an ounce of perfectly fresh tannin must be mixed with six drachms of water, in which it readily dissolves. This solution is a thick fluid, of the colour and consistence of treacle, which keeps much better than tannin itself. I am in the habit of prescribing it as Martin's solution, having learnt it from a paper by Mr. Martin in the British Medical Journal of March 20th, 1869. Mr. Martin recommended it as a method of converting living skin into leather.

Most of the tannic acid found in shops contains a large proportion of gallic acid, and will not yield a very strong solution. But, if an ounce of old tannic acid be mixed with two ounces of water, a tolerably strong solution, which answers for many purposes, may be decanted off after subsidence.

The strong solution of tannin is a most powerful astringent, almost free from irritating properties. It is one of the best dressings for wounds—far superior to collodion, and even less irritating than the styptic colloid, which it somewhat resembles. If applied by a brush and allowed to dry, it soon forms a pellicle which excludes the air, and gives ease to pain. It may be applied to almost any form of ulcer, and to wounds after amputations or other operations, especially when not very deep. It answers well, for instance, after the operation for harelip, painted over the pins and threads, in the same way as collodion is sometimes used.

In a female, aged twenty-six, the hair was caught between rollers and the whole scalp removed to within an inch of the left eyebrow and two inches from the right, round on a level with the tips of the ears to about the external occipital protuberance, the periosteum being extensively removed at the vertex. There was much suppuration, followed by erysipelas. After three months, exfoliation of bone occurred, and skin-grafting was performed, first with eleven grafts, and, six weeks subsequently, with twenty-one. After varied treatment, antiseptic and other, little progress was made, till, nine months after the accident, strong tannin-solution was applied. Discharge and fœtor diminished at once, and the healing process went on more quickly than before. Tenderness diminished, and the general health improved rapidly for the first time since the

accident. The wound, eighteen months after the accident, was about half its original size, and the discharge trifling. The patient does household work, wears only a thin cap, and is little worse for the accident, generally or locally.

Strong tannin solution applied to the ulcerated skin of ingrowing toe-nail at once removes pain. After one application, the offending corner of the nail may be readily raised, a little lint inserted underneath, and the nail allowed to grow up. Among many cases, I have in this way cured one in which evulsion, twice performed, had proved only a temporary remedy, the disease being reproduced each time the nail grew up. For cracked nipples, Martin's solution, diluted with an equal quantity of water, is the best application, and corresponds to the tannin-solution commonly used for this purpose.

Enlarged tonsils may be reduced by daily brushing with Martin's solution. This treatment, though vastly inferior to extirpation, or even to the application of potassa cum calce, is painless, and therefore, in some cases, useful.

Bleeding warts may be readily removed by this application, as also by the perchloride of iron. I have found the former to readily reduce the granulations from an unhealed umbilicus in an infant.

Chronic phlegmonous erysipelas in the legs may be painted with it with great advantage. I have not found it so useful in acute erysipelas or erythema. As Mr. Thomas says, concentrated tannin drops are an useful remedy after the removal of polypi from the ear. I have known them to remove a small polypus without operation. They check discharge and remove fœtor in chronic catarrh of the middle ear.

I have long been prepared to use Mr. Martin's solution in any case of severe uterine hemorrhage I might meet with, as Mr. Thomas suggests, but have not yet had occasion to do so. Its powerfully astringent properties mark it as admirably suited for this purpose. For the same reasons, tannin seems a much more suitable agent than perchloride of iron for injecting into aneurisms. Some experiments I have made on animals show that the concentrated solution coagulates blood moving in a living artery, without causing any redness or cauterisation of the walls of the vessel. The clot formed was tolerably firm. I have abandoned this subject, however, being convinced that no good results would follow any form of injection in aneurism, unless the artery can be thoroughly compressed below, in which case injection is superfluous.

Tannin is well known to precipitate albumen and gelatine from solutions. It even precipitates very watery urine. Its actions on the organism are likely to prove extensive and valuable.—*British Medical Journal, Nov.* 7, 1874, *p.* 587.

90.—IODIC ACID AS A TEST FOR STRYCHNINE.

By Dr. Reginald Southey, Physician to St. Bartholomew's Hospital.

Two years ago, while preparing my experiments illustrating the tests for the poisons in the course of my lectures upon Forensic Medicine, it occurred to me that iodic acid would prove a far more delicate colour-test for the presence of strychnine in very minute quantities than any of the ordinary oxidising agents ordinarily recommended for employment in the standard works on forensic medicine—bichromate of potash, peroxide of manganese, ferrocyanide of potassium, black oxide of manganese, &c.; for these are all substances which, either in solution or mixture with fluid, possess colour in themselves, and although it is not one single colour, but a play and successive change of colours, that signifies the presence of this particular alkaloid, still a colourless test solution appeared to me a real desideratum.

As a class experiment I found a saturated solution of iodic acid answer admirably, not by producing any play of colours when warmed in contact with strychnine, but by evolving an invariable pink-rose tint, which lasts for some little time—an hour or more—and gradually fades out through flesh to a fawn coloured substance.

The test was pre-eminently delicate, and the resulting compound formed with the iodine made a rather bulky cake, which in the instance of very minute quantities of the inspected substance and test fluid, could be made clearly apparent to a large class on the cover-lid of a small porcelain crucible.

In order to examine the further applicability and practical use of the test, I poisoned a dog with a quarter of a grain of strychnine, injecting this in solution subcutaneously, and examined the urine, of which nearly six ounces were collected, for the presence of the alkaloid, proceeding upon Sta's method, and obtaining distinct evidence of the alkaloid in the final chloroform extract, both by the iodic acid and bichromate of potash colour-test: I was highly gratified by the more ready applicability and greater sensitiveness of the iodic test.

In May of this year an old pupil of the Hospital brought me the contents of a human stomach to examine from a case of suspected poisoning by strychnine (Battle's vermin-killer). At the time, I wished that either a portion of the blood or of the urine had been given me to analyse, rather than the contents of the stomach; for strychnine appears one of those poisons which are quickly and sometimes entirely removed by absorption from the stomach, while still present in notable quantity in the blood and urine.

However, I instituted my examination, which I may perhaps be pardoned for detailing here, and again succeeded in discovering the presence of strychnine enough to swear to, although in almost infinitesimal quantity.

First, I acidulated the stomach contents with hydrochloric acid warmed over a steam-bath for half an hour, strained off and filtered the liquid.

This filtrate I now shook up with a nearly equal quantity of sulphuric ether, seeking by this to separate as much of the fats and other organic matters as I could from the mother liquor, and knowing that strychnine is not separated from its salts by ether. From the ether I separated the remaining liquid by decantation. This was next concentrated, cooled, and neutralised by potash, adding an excess of alkali, and the alkalised liquor now shaken up with chloroform.

This chloroform extract, evaporated to dryness, was a greasy compound still containing fat and organic material, but examined under the microscope, appearing to contain crystalline forms, which were branched and dentritic, and nearly corresponded with the illustrations given in Dr. Guy's valuable little manual of the forms in which this alkaloid is deposited from its chloroform solution.

A minute portion tested with bichromate of potash gave no reaction that could be relied upon, there being still too great organic impurity present, and the colour of the bichromate of potash crystal interfering with any appreciation of slight colour changes. The further purification of the residuum from organic matter was a long and tedious process. The substance was treated with sulphuric acid, and heated at the temperature of the steam-bath for several hours together; then neutralised by potash and filtered, and the filtrate treated as before with chloroform.

After this had been done a second time, the alkaloid was obtained in sufficient purity and quantity to give a distinct rose-pink colouration with iodic acid; but the same operation of charring away all remaining organic matter by sulphuric acid had to be repeated four times in all in order to purify the strychnia enough to give a satisfactory reaction with potassic dichromate dissolved in strong sulphuric acid.

As to the nature and composition of the compound formed by strychnia and iodic acid I must refer the reader to works on chemistry.

Dr. Miller in his Organic Chemistry, part iii., page 543, says, "A portion of the hydrogen in strychnia may be displaced by chlorine or by bromine, and the body thus obtained still retains basic properties." "Strychnia, when triturated with iodine, forms a peculiar crystalline compound."

Certain it is that some definite compound is formed when the mixture of iodic acid and strychnia is gently warmed, and nascent iodine is then evolved. As the heat is increased, the substance crepitates, and little violet clouds of iodine are shot into the air, the original rose-coloured cake quickly assuming a fawn colour with a glaze upon it much like a macaroon.—*St. Bartholomew's Hospital Reports, vol.* x., 1874, *p.* 301.

91.—A NEW TEST FOR OPIUM.

By Dr. REGINALD SOUTHEY, Physician to St. Bartholomew's Hospital.

Another test for opium has been discovered. A colour-test, at once so characteristic and intense, of such easy applicability and such extreme delicacy, that it needs only to be more generally known in order to be often employed.

Molybdic acid dissolved in pure sulphuric acid is the test fluid. A saturated, or at all events a strong solution should be made.

The reaction is produced by the morphia in opium, not by the meconic acid: the latter undergoes no change with the reagent; the former in minutest quantities at once furnishes characteristic reaction. The best mode of proceeding is to place a drop of the suspected fluid side by side with a drop of the test fluid by means of a glass rod upon either a porcelain slab or slip of glass laid upon white paper.

At once, if morphia or any of its salts be present, a beautiful deep maroon colour will be presented when the fluids are brought in contact. This colour changes after a while, becoming first deep purple, and then gradually losing its red element, and becoming shortly dark, and later a brighter blue. This blue colouration is maintained for several hours, but gradually fades out.

In evidence of the minuteness of this test I may adduce the following facts. The reaction is distinctly obtained with a single drop of the pharmacopeial tinct. opii, as also with the compound tincture of camphor.

The presence of a good deal of impurity and of alien organic matter does not interfere much with it.

Of this I feel confident, that the busy practitioner will hail this new discovery, which enables him to detect laudanum or morphia in the dregs of bottles brought to him to test and in fluids vomited, and to swear to its presence with positive security. Further experimentation has convinced me that this test is most sensitive when freshly prepared; still two months after it was made, I was enabled by its employment to detect

the $\frac{1}{40}$ of a grain of morphia as presented in the morphia lozenge of our Pharmacopeia.—*St. Bartholomew's Hospital Reports, vol.* x., 1874, *p.* 303.

92.—THE HYPODERMIC INJECTION OF ERGOTIN.

By Dr. W. J. Cleaver, late Senior Surgeon Liverpool Royal Infirmary.

The use of ergot of rye in this country seems to be almost exclusively employed in obstetric practice, but believing that its more extended use may be found beneficial in general practice, I propose making a few remarks regarding its applicability as a hæmostatic in various diseases, especially in the form which has been called *ergotin*.

There appears to be a little difficulty with some chemists as to what *ergotin* really is, some vaguely calling it the active principle of ergot, as, indeed, its name implies; others that it is the pharmacopœial liquid extract of ergot evaporated down to the consistence of an extract. But that form which has been most generally employed both in this country and on the Continent is the so-called *ergotin* prepared by Bonjean's process, and is simply a purified extract, the following being the mode of preparing it: "Exhaust the ergot with water, evaporate to the consistence of syrup, precipitate the albumen, gum, &c., by a large excess of alcohol, decant the clear liquid, and evaporate to the consistence of a soft extract;" it is thus an alcoholic extract, whereas the extractum ergotæ liquidum is only half so.

Badly and carelessly prepared ergotin is liable to do harm when administered hypodermically, and to induce erythema and cellulitis by the injection of very small quantities, so that great care should be employed as to the source whence the drug is obtained.

Ergot has long had the reputation of being a styptic, and if its physiological action of inducing contraction in the involuntary or non-striped muscular fibre was more generally known and acted upon, its sphere of usefulness would be very greatly extended.

Dr. Jacobi, Dr. Meadows, Brown-Séquard, and others, have written upon the physiological action of ergot, and Von Langenbeck and others on the Continent have used ergotin most successfully in cases of aneurism and hæmoptysis.

In 1870 Dr. G. W. Balfour, of Edinburgh, recommended the hypodermic injection of ergotin in hemorrhages of various kinds, and being at that time a resident surgeon in the Edinburgh Infirmary, I was able to test the treatment in cases

of oozing after operations and in epistaxis, but did not keep notes of the cases; it was also generally used over the hospital for hæmoptysis and hæmatemesis with surprisingly good results.

During the time I was house-surgeon of the Liverpool Infirmary, as may be supposed, I saw a considerable number of patients suffering from epistaxis, but have never had occasion to plug the posterior nares in a single instance, treatment with ergotin being invariably successful. I kept notes of most of these cases, and the following are selected from among them:

Case 1.—A butcher, aged 28, had suffered from attacks of epistaxis, which had occurred monthly for the five months previous to his presenting himself at the infirmary; each attack had lasted for three or four hours, and he had been treated with gallic acid and iron; on two occasions his posterior nares had been plugged, but with little benefit. The day he presented himself at the Infirmary the hemorrhage was copious, apparently coming from both nostrils, and he had then been bleeding for half an hour. I injected five grains of ergotin dissolved in twenty-five minims of water into his forearm; in less than four minutes the hemorrhage had entirely ceased, and as the man was working at the slaughter-house just below the Infirmary I allowed him to leave. In three weeks he returned, being just in the same plight, and during the next four months he came up five times, when the same treatment was adopted with the same success. Six months after I called in to see him and he had had no return.

Case 2.—A girl, aged 18, who a fortnight previously had been plugged for epistaxis. The hemorrhage had returned; and her horror of the previous operation was so great that she said she would rather suffer any pain than go through it again. Four grains of ergotin were injected, arresting the bleeding within three minutes.

Case 3 was a sailor, looking anæmic and blanched, who, on the voyage home from Calcutta, had bled seriously at the nose about every third day. He was admitted into the Infirmary; the day after, the hemorrhage came on—not copiously, but, in his weakened condition, to a very dangerous extent. I injected five grains of ergotin, when the bleeding almost instantly stopped. The patient stated that when at sea he could never get the blood to cease flowing under two hours, with cold applied to the back of the neck and face, and washing his mouth out with cold water. The hemorrhrge returned slightly four days after, and was instantly checked with the ergotin. A fortnight after, he was discharged, no return having taken place.

The remainder of the cases of epistaxis were all treated in the same manner and with the same results.

I have notes of only two cases of hæmoptysis treated with ergotin. The first was a tubercular-looking girl, aged 17, who had suffered from hæmoptysis for some days previous to my seeing her, bringing up mouthfuls of bright red blood. I injected four grains of ergotin; and although I kept her under observation for four days, only two bloody sputa followed, and those within half an hour of the injection. There were no signs of tubercular mischief in the lungs.

The second case was a woman, aged 32, who had been spitting blood for the past three months; and on the day of her admission, according to her own account, she had vomited up a pint of bright red blood, and was when I saw her still bringing up mouthfuls. Five grains of ergotin were injected; no blood was expectorated for five days, when there was a slight return, the sputa just being streaked. For the next fortnight she rapidly gained strength, and there was no return.

There is one other case I would mention, of a woman who was admitted into the Infirmary with flooding from a fibroid tumour of the uterus. The vagina had been plugged before admission with sponges, but the hemorrhage was still very considerable. I injected five grains of ergotin, which arrested the bleeding in two or three minutes. Exactly twelve hours after, the flooding recommenced, and was stayed in the same manner; and for the next three days I had to repeat the process every twelve hours. The blood became very watery, and the patient eventually died from loss of blood and sheer exhaustion, four days after the last injection of ergotin.

There are many other cases I might cite, such as bleeding from internal hæmorrhoids and in dysentery, which were successfully treated with ergotin; but the foregoing, I think, are sufficient to show that ergotin, injected subcutaneously, possesses in a remarkable degree the properties of a hæmostatic.

In addition to its successful use in the cases of epistaxis above mentioned, the simple manner of application, which is effected by passing a needle under the skin, compared with the disagreeable operation of plugging the posterior nares, should not be lost sight of.

More recently I have found, by treatment in various cases, that three grains of ergotin have proved quite as efficient as five; and as bulk is a great consideration in subcutaneous injection, I have adhered to the smaller dose. This amount, viz., three grains, can readily be dissolved in ten minims of warm water.

The pure ergotin, when kept covered in a porcelain pot, will

keep for any length of time; but when liquefied with water, it soon loses its active properties, and becomes inert.

These brief remarks are offered, trusting that more general attention may be drawn to the use of this valuable drug, and in the hope that they may lead to further experiment, from which good may result.—*Liverpool and Manchester Medical and Surgical Reports*, 1875, *p.* 13.

93.—COPAIBA AS A DIURETIC.

By Dr. E. L. Dixon.

[We are certainly in want of a good diuretic—the uncertainty and inefficiency of those at present known being often the cause of disappointment to the physician. Attention has recently been directed to copaiba by Dr. Wilks; and perhaps the record of the three following cases, in which the great benefit produced seemed to be the result of the administration of the medicine, may not be without interest.]

1.—*Ascites: Cirrhosis Jecoris (First Stage).*—Wm. Gardner, aged 45, hatter, admitted into Preston Infirmary under my care, 9th Jan. 1874. Has enjoyed generally good health, and has never had syphilis. Married at 21, and has had nine children, four alive, four still-born, and one dead from "fits." At 34 began to suffer from left inguinal hernia, which came on when he was at work; it gradually increased to its present large size, and has never been reduced. At 37 he took a public-house, when he drank freely of beer and whiskey. Some months ago noticed he was increasing in size, and he became unfitted for much work.

He is of an unhealthy sallow aspect, the conjunctivæ being yellowish and the skin harsh and dry. Considerable ascites: measures round the umbilicus 42 in. Large scrotal hernia of left side, only partially reducible. Liver extends to about 2 in. below the ribs, and can easily be felt to descend on forced inspiration; lower edge rounded; no bosses on the surface; it feels firm and somewhat rough. Has passed blood by the bowels, which are now constipated; no hemorrhoids. Passes only a small quantity of urine in the twenty-four hours of sp. gr. 1·026; no albumen or bile. Appetite bad.

He took blue pill at night, with compound jalap powder in the morning, and also a mixture containing acid tartrate of potash and taraxacum. No improvement was effected; the ascitic fluid was not diminished, nor the amount of urine increased; and on the 21st he was ordered to take three capsules of copaiba night and morning, with the result shown

in the annexed table. The capsules were Durant's, and contained each from five to ten minims.

Jan. 17 . . .	13 oz.	Jan. 26 . . .	63 oz.
Jan. 20 . . .	8½	Jan. 27 . . .	69
Jan. 21 . . .	14½	Feb. 1 . . .	80
Jan. 22 . . .	13	Feb. 3 . . .	82
Jan. 23 . . .	14	Feb. 11 . . .	74
Jan. 24 . . .	65	Feb. 19 . . .	66
Jan. 25 . . .	74	Feb. 25 . . .	50

Thus, three days after the copaiba was prescribed the urine increased from 14½ to 65 oz. in twenty-four hours. Shortly after I was told that it had become albuminous. I therefore tested it, when I found it become opaque upon the addition of nitric acid both when cold and after boiling; but boiling alone produced no change, except that the urine gave out a very perceptible odour of copaiba, which was doubtless the cause of the turbidity produced by the acid. The sp. gr. of the urine was, on the 22nd, 1·025; on the 24th, 1·014; on the 25th, 1·010; on the 26th, 1012. The girth at the umbilicus was on 1st Feb. 37¼ in.; on 11th, 35 in.; and on 25th 34 in. Feb. 26: There is no ascitic fluid to be detected, the vertical dulness of the liver is 6 in.; there is no alteration on palpation. There is still slight sallowness; the appetite is good, the bowels are regular, and his general condition is much improved. Discharged. He attended for some time as an out-patient, and kept better and free from dropsy. He was recommended to become a teetotaller.

2.—*Morbus Cordis: Emphysema and Œdema Pulmonum: Anasarca.*—William Buskell, aged 73, a fish hawker, admitted into Preston Infirmary, under my care, 23rd Oct. 1873. Has never had acute rheumatism. Has a mitral systolic bruit at the apex of the heart: hyper-resonance on percussion, generally over the chest, with universal prolonged expiratory murmur, and minute crepitation at the bases of the lungs. There is a trace of albumen in the urine, which is very scanty, and of sp. gr. 1·020; on the 8th November it was measured as only 7 oz. Considerable anasarca. The treatment consisted in the use of hydrogogue purgatives, such as the pulv. jalapæ comp.; turpentine epithems to the chest; a blister between the scapulæ (Nov. 4th), when the orthopnœa became very distressing. Diuretics of various kinds were successively given, carbonate potash, spirits of nitre, squill, &c.; the pill with digitalis, squill, and blue pill; infusum lupuli; gin; acid tartrate of potash, &c.; but without any increase in the amount of urine. Nov. 26: The urine continues so scanty that it cannot easily be collected: the anasarca is rapidly

increasing and is now very great, the minute crepitation at the bases of the lungs extends, there is persistent orthopnœa, and the patient is evidently in a very critical condition. Three capsules of copaiba are ordered to be taken night and morning. In a few days the amount of urine began to increase, and on the 3rd December it was again begun to be collected as detailed in the table; the amount is exclusive of that passed at stool, and the bowels were always acted upon daily:—

Dec. 3	46 oz.	Dec. 15	105 oz.
Dec. 4	36	Dec. 16	98
Dec. 5	25	Dec. 17	83
Dec. 6	35	Dec. 18	103
Dec. 7	15	Dec. 19	100
Dec. 8	43	Dec. 20	84
Dec. 9	109	Dec. 21	48
Dec. 10	52	Dec. 23	50
Dec. 11	106	Dec. 27	50
Dec. 12	99	Dec. 30	45
Dec. 13	108	Jan. 6	40
Dec. 14	98		

On 15th Dec. it was noted that the œdema had absolutely disappeared. 23rd: Two capsules only twice a day were ordered. Jan. 22, 1874: Capsules omitted entirely, and a mixture of tartrate iron and infusion of broom ordered. Feb. 21: Has remained free from dropsy and from œdema of the lungs, and is now discharged.

3.—*Morbus Cordis: Albuminuria: Ascites: Anasarca.*—Ellen Glegg, aged 36, married and has a child eight months old, admitted into Preston Infirmary under my care, 12th May, 1874. There is a loud systolic bruit at the apex of the heart, the impulse of which is notably increased; pulse very small and irregular. The liver extends two inches below the margin of the ribs, and there is some ascitic fluid within the abdomen. Urine sp. gr. 1·018; albumen $\frac{1}{3}$. No casts were detected under microscope. Considerable œdema of the legs which has existed five weeks. She has been ill, she says, since Christmas, when she hurt her back; no hemorrhage was, however, produced; has never had acute rheumatism. She was ordered tartrate of iron, with squill, digitalis, &c.; imperial drink, with compound jalap powder occasionally. The urine continued very scanty, and no improvement seemed to take place at all, when, on the 22nd, she was ordered to take two copaiba capsules every night. The very next day, the urine of that day being measured the following morning the

amount was nearly trebled, as will be seen by the accompanying table:—

May 17	8 oz.	May 29	88 oz.
May 18	16	May 30	78
May 19	20	June 1	90
May 20	8	June 2	93
May 21	16	June 3	88
May 22	20	June 4	58
May 23	54	June 5	42
May 24	33	June 6	47
May 25	50	June 7	40
May 26	76	June 8	47
May 27	72	June 9	35
May 28	90		

Not only did the quantity of urine thus increase, but the albumen absolutely diminished, for on the 9th June merely a trace of it was discoverable; although it might have been feared that such an irritating diuretic would have acted most perniciously upon the kidneys in this case. On 1st June the sp. gr. was 1·010. On 3rd June it was noted that the weather was very hot. The dropsy rapidly disappeared, and she was discharged from the infirmary at her own request on 16th June, quite free from either ascites or œdema.—*Practitioner, Feb.* 1875, *p.* 81.

94.—ON APOMORPHIA.

By Dr. WALTER G. SMITH, Examiner in Materia Medica, Queen's University, Ireland.

1. Apomorphia, or rather hydrochlorate of apomorphia, when pure, and employed in suitable doses, is a rapid, simple, and harmless emetic.

2. It is *rapid*, for its action always takes place, at latest, within ten minutes after administration.

3. It is a *simple* emetic, for it does not appear to exert any influence upon the other functions.

4. It is *innocent*, and does not seem to possess dangerous toxic properties.

5. Lastly, the facility with which it can be administered by hypodermic injection fulfils a therapeutic desideratum, and suggests its adoption by physicians in some special circumstances, such as the medication of children and of the insane.

At present the whole supply of apomorphia is derived from two houses—viz., Macfarlan & Co., Edinburgh; and Merck, of

Darmstadt. The preparation supplied by the former is said to be the most active and reliable, but, as yet, there is no convenient test for determining the purity of the product.

As an average dose for an adult man of the (Scotch) hydrochlorate of apomorphia, M. Bourgeois fixes on 1 cgrm. (nearly $\frac{1}{6}$th gr.) hypodermically, and 3 cgrms. (*i.e.*, $\frac{1}{2}$ gr.) by the mouth. The best form of solution is that obtained by dissolving 1 part of the salt in 100 parts of distilled water. If the proportion of the salt be greater, the solution becomes muddy, and it is necessary to add one or two drops of HCl in order to clear it—a serious objection in the case of a liquid intended for subcutaneous injection.

From his experiments on dogs, the author concludes that the toxic action of apomorphia is extremely feeble; the minimum dose capable of inducing vomiting is about 3 mgrms., and the effect does not appear to be weakened by repetition of the same dose on several successive days.

An observation of Siebert bears upon this point. This experimenter had a bitch, weighing 6 kilogs., which invariably vomited within three minutes after a dose of 1 mgrm. of hydrochlorate of apomorphia. For fifteen days the same injection was practised, and was always followed by the same result. On the fifteenth day 1 decigr. was injected; the animal vomited for three-quarters of an hour, and was restored at the end of another hour. After the lapse of a week, the experiment was repeated for fifteen days consecutively, and always with the same result.

It is a noteworthy point that no local irritation follows on the hypodermic injection of apomorphia, either in man or the lower animals. The physiological action of apomorphia upon the pulse agrees with that observed under the production of nausea and vomiting by other means—viz., acceleration before emesis takes place, and subsequently a slight depression, with speedy return to the normal. The respiration becomes quickened and irregular previously to vomiting, and the temperature is not sensibly affected in man. There is complete freedom from gastro-intestinal irritation of any kind, and neither colic, tenesmus, nor abundant stools were observed. In many cases, the act of vomiting is succeeded by an irrepressible desire to sleep. A full dose of apomorphia will induce vomiting at the end of *one minute*, whereas the emetic action of a moderate dose of emetin (active principle of ipecacuanha) is not manifested for twenty or thirty minutes.—*Dublin Journal of Medical Science, March* 1875, *p.* 228.

95.—ON ALCOHOL.

By Dr. B. W. Richardson, F.R.S.

Disposal of Alcohol in the Organism.—We are brought now to one of the most important parts of our study. We see that, under favouring conditions, alcohol will oxidise in the presence of the air. We see that it will oxidise in two ways; actively, with the production of much heat, and with the formation of carbonic acid and water; passively, with the production of aldehyde and acetic acid.

In the human body, do any similar changes take place? Throughout the whole of this vast sheet of the minute circulation there is ever in progress, during life, a process of slow oxidation of carbon and hydrogen, by which heat is produced, and carbonic acid and water are produced. The heat is proved by the animal warmth which is ever present in our bodies while we live; the carbonic acid and water, as products, are proved by their continued presence in the secretions from the lungs, skin, and other organs.

Alcohol, we have seen, is carried by the blood into this minute circulation. Is it possible that it can pass through that ordeal and undergo no chemical change? If it do undergo any changes, what is their nature? These questions have occupied the attention of many gifted minds; but they are not yet solved. Let me endeavour to put the position in which they stand plainly before you.

The earlier physiologists of this century came naturally enough to the conclusion that the alcohol taken into the body is consumed there with the evolution of heat. A certain development of heat in the superficies of the body, and a certain sensation of glow which follows upon the imbibition of spirit, lent countenance to this suspicion. But in course of time, independently of any knowledge of the effect produced by alcohol in the minute circulation of the blood, it began to be doubted whether alcohol was disposed of in the organism by its combustion. Some observers had noticed, in conducting the examination of the body after death from excess of alcohol, that the odour of the substance was present in the tissues, especially in the nervous tissue, and it was doubted whether the alcohol might not under some circumstances remain in the organism without undergoing any change at all. In 1860 three eminent Frenchmen, Lallemand and Perrin, assisted by Duroy, published a price essay on alcohol, in which this view was maintained, or, as the authors would probably say, was originated; for in truth they were the first to state the view on direct scientific evidence. From the result of many experi-

ments, they came to the conclusion that alcohol taken into the living body accumulates in the tissues, especially in the liver and in the brain, and that it is eliminated by the fluid secretions, notably by the renal secretion, as alcohol. They sought in the different tissues for evidence of the secondary products of the oxidation of alcohol, for aldehyde, acetal, and acetic acid; and they found none of those products, except some acetic acid in the stomach, which acid, they concluded, was formed from the alcohol received directly into the stomach and from the action exerted upon it there by the gastric juice. The experiments carried on by these inquirers were so numerous and careful, and the results they arrived at were so definitely stated that their labours were for a season accepted as conclusive by many men of science, and by the majority of the public. It was ascertained by other experimentalists that alcohol is eliminated by the system in the direct way, as alcohol, and the question of elimination rested as if it had been solved.

The interval of credence in these assertions was not very prolonged. An English physician soon commenced to cross a lance with his learned French peers, and to point out certain distinct errors in their results. I have no doubt many of you know, before I mention his name, that he to whom I refer was the physician who last year lost his life from the performance of his professional duties—the late Dr. Anstie. Respecting this observer, whose friendship I owned for many years, it is meet for me to pay this public tribute of respect; that no man I ever knew combined with vigour of mind, such incomparable industry and courage, or a more honourable regard for scientific truth and honesty. The subject we are considering has lost no investigator more ably learned for the work that still remains to be done.

From Dr. Anstie came the earliest expressions of doubt relative to this hypothesis of what is called the direct elimination of alcohol by the secretions, and from him have come the latest objections. His arguments have been sustained abroad by Schulinus, and in this country by Drs. Thudichum and Dupré, whose work on wine will, even in another century, be more highly prized, if that be possible, than it is now. The sum and substance of the labours of these observers is stated in a few words. They prove that while it is true that, under certain circumstances, alcohol taken into the body will pass off in the secretions unchanged, the quantity so eliminated is the merest fraction of what has been injected, and that there must be some other means by which the spirit is disposed of in the organism. In a lecture I delivered on this subject in the year 1869, I ventured to suggest, in commenting upon a series of

Dr. Thudichum's remarkable researches, that perhaps one element of research was wanting to prove conclusively the fallacy of the direct elimination hypothesis. I thought that sufficient time had not been allowed between the administration of the spirit and the final determination made for it in the excreted fluids. It was not, I argued, shown how much spirit the tissues would hold unchanged. The objection was sound, and it has been renewed by more recent experiment.

In the last research conducted by Anstie, in which he was assisted by Dupré, the results of the experiments were unmistakable in their bearing on the points now under our consideration. The history of these labours is recorded in full in the last paper written by Dr. Anstie, and published in the journal called the Practitioner, for July, 1874.

The test that had been commonly employed for determining the presence of alcohol in the fluid suspected of containing it, was the colour-test. A solution is made of this salt, the bichromate of potassa, with sulphuric acid. When to this solution alcohol is added, there is a change of colour from brownish red to green; owing to the reduction of the chromic acid to the green oxide of the base chromium. By marking the difference of colour produced, a scale can be adopted which will show the extent of the reduction, and thereby the amount of the spirit that has caused the change. This process was improved by Dr. Dupré. He distilled the fluid in which alcohol was believed to be present, aud then, after treating the distillate with the bichromate and sulphuric acid solution, he tested with a standard solution of soda for the amount of acetic acid which would be produced by the oxidation of alcohol were that fluid present.

This modification of test was and is a very considerable advance, since it enabled the observers to conduct their determinations with greater accuracy of detail. In the research they conducted with it two facts of singular interest were elicited. The first fact was discovered by Dr. Dupré. It was, that from the secretions of persons who do not drink alcohol at all a fluid can be distilled which affects the chromic test as if alcohol were actually present in the secreted fluids, and that this hitherto unsuspected product is oxidised into an acid so like acetic acid it cannot be distinguished from it, and is apparently identical with it. To be plain, Dupré's discovery suggests that no man can be, in strict scientific sense, a non-alcoholic, inasmuch as "will he nill he"—he brews in his own economy a "wee drap." It is an innocent brew certainly, but it is brewed, and the most ardent abstainer must excuse it. "Argal, he that is not guilty of his own death shorteneth not his own life." The fault, if it be one, rests with nature, who according to

our poor estimates, is no more faultless than the rest of her sex.

The second fact, which came chiefly from the labours of Dr. Anstie, was that from animals under alcohol, not one of the secretions, not all the secretions combined, yielded any more than a fractional amount of the alcohol that had been administered. The experiments were by necessity made on the inferior animals, but they supplied none the less conclusively the fact stated. It was proved that an animal, a terrier dog, weighing ten pounds could take with comparative impunity neary 2.000 grains of absolute alcohol in ten days, and that on the last day of this regimen he eliminated by all the channels of elimination only 1·13 grains of alcohol. This fact was of itself sufficiently remarkable, but another still more important remains to be told. In completion of his research after an animal had been treated with alcohol, as above described, Anstie killed it instantly and painlessly, two hours after it had received the last quantity—ninety-five grains—of spirit. Then the whole body, including every fragment of tissue with all the fluid and solid contents, was subjected to analysis, with the result of discovering only 23·66 grains of spirit.

We are driven by the evidence now before us to the certain conclusion that in the animal body alcohol is decomposed; that is to say, a certain portion of it (and if a certain portion why not the whole ?) is transmutable into new compounds. The inference that might be drawn is fair enough, that the alcohol is lost by being burned in the body. It is lost in the body, and out of the body it will burn. If it will burn in the organism it will supply force, for it enters as the bearer of so much potential energy. In combining with oxygen, is there then a development of force or heat to the extent that would be developed in the combustion of the same quantity in the lamp, or from the distribution of it over the platinum black? At the same time, and in corroboration, is that product of its combustion, carbonic acid, to be discovered in the excretions? If there be heat, and if there be product of carbon consumed in oxygen, then alcohol must rank as a heat-forming food.

Alcoholic Phthisis, or the Consumption of Drunkards.—There are fatal mischiefs induced in the lungs by the persistent resort to alcohol; and to one of these I would direct special attention. It is that deterioration of lung-tissue to which, in the year 1864, I gave originally the name of *alcoholic phthisis* or *the consumption of drunkards.* The facts came before me at first in this manner. In a public hospital to which I acted as physician, I had brought before me, in the course of many years, two thousand persons who were suffering from consumption. I gathered the history of the lives of these, and of the reasons

why they had passed into the all but hopeless malady from which they suffered. In my analysis of these histories I found that the causes of the malady altogether were, in the great majority of instances, predisposition from hereditary taint, exposure to impure air, want, or certain other allied causes. But the analysis being conducted rigidly, I discovered that when every individual instance had been classified as due to the causes stated above, there remained thirty-six persons, or nearly two per cent. who were excluded from them, who appeared to suffer purely from the effects of alcohol, and in whom the consumption had been brought into existence by the use of alcohol.

The added observations of eleven years since the above-named fact was recorded in the Social Science Review, as a new fact in the history of the disease, only served to prove in the minds of other men as well as my own the truth of the record.

The persons who succumb to this deterioration of structure induced by alcohol, are not the exceedingly young, neither are they the old. They are usually over twenty-eight and under fifty-five. The average age may be taken as forty-eight. They are persons of whom it is never expected that their death will be from consumption; they are generally males. They are probably considered very healthy: men who can endure anything—sit up late at night, run the extreme of amusements, and yet get through a large amount of business. They sleep well, eat pretty well, and drink very well. They are often men of excellent build of body, and of active minds and habits. They are not a class of drinkers of strong drinks, who sleep long, take little exercise, and grow heavy, waxy, pale—

"Sleek headed men, and such as sleep o' nights."

On the contrary, they take moderate rest, and see as much as they can. Neither in the ordinary sense are they drunkards; they may never have been intoxicated in the whole course of their lives, but they partake freely of any and every alcoholic drink that comes in their way, and they bear alcohol with a tolerance that is remarkable to observers. They are hard drinkers as distinguished from sots. Beer is to them as water, Wine is weak; the only thing that upsets them is stiff grog in relays, or a mixture of spirituous drinks carried to the extent of what they call, in grim joke—in which death surely joins—"piling the agony."

As a rule these cannot live in what they consider to be comfort without a daily excess of alcohol, which excess must needs be renewed on emergencies, if there be greater amount of

work to be done, less sleep to be secured, or more life to be lived.

As specimens of animal build these persons are often models of organic symmetry and power. In fact, they resist the enemy they court for so long a time because of the perfection of their organisation. More than half of those whom I have seen stricken down with alcoholic phthisis have expressed that they had never had a day's illness in their lives before; but questioned closely it was found that none of them had actually been quite well. Some of them had suffered from gout, others from rheumatism or neuralgia. They had felt severely any depression, such as that which arises from a cold; and if they had been subjected suddenly to causes of excitement or exhaustion, they detected, without actually realising its full meaning, that their balance of power against weakness was reduced, that the end of the beam called strength was rising, and that an extra quantity of alcohol was required to bring back equilibrium. As a rule men of this class are thoughtless of their own health and their own prospects, for they have an abundant original store of energy. They are designated as "happy-go-lucky" men, or as men who "always fall on their feet," which truly they do, but not without injury.

The countenance of the alcoholic consumptive differs from that which is usually considered the countenance of the consumptive person, and equally from that which all the world adjudges as belonging to the man who indulges freely in strong drink. Who does not remember the wan, pale, sunken cheek of the youth on whom ordinary consumption has set its mark? And who, again, does not recall the *facies alcoholica*—the blotched skin, the purple red nose, the dull, protruding eye, the vacant state of the confirmed sot? The alcoholic consumptive has none of these characteristics. His face is the best part of him in all his history. When his muscles have lost their power and his clothes hang loosely on his shrunken limbs, he is still of fair proportion in the face; he has little pallor and he is expressive in feature, so that his friends are apt to be deceived and to believe that there must be hope for his recovery, even when he is beyond every hope. I remember being actually taken aback on one occasion on finding, in a man who seemed, from his face, to be in perfect health, how completely destroyed his lungs were by the encroachments of disease; and I cannot be surprised, therefore, that others, less informed, should share in such an imperception of danger when it is close at hand. Nobody, in a word, "pities the looks" of these sufferers, and good eyes are necessary to learn that pity is called for.

The phenomena are not always developed at a time when the sufferer from them is indulging most freely in alcohol. On the contrary, it is by no means uncommon that the habit of excessive indulgence has been stopped for some time previously to their development. The reasons assigned by the patients for abstinence vary. One man may have been strongly advised by his friends to desist, or may himself have undergone a certain measure of reform; another has been led by the reading or hearing of arguments on temperance; a third, by want of means to obtain the indulgence; but by far the larger number tell you that a time came when the desire for so much drink did not occur to them. They will state that they tried the round of the various spirits, but found that none agreed with them as before, so that at last they were driven to rely on beer as the only drink they cared for. We read all this off clearly enough from a physiological point of view. We see that, in fact, the body has been resisting the alcohol; that it could not do away with it as it did when all the excreting organs were in their full prime; and that those drinks only can be borne in which the amount of alcohol is least, but the sufferer does not comprehend the fact, and therefore he not unfrequently concludes that his increasing languor and debility are due to the necessary withdrawal of the stimulus on which he seems to have been actually feeding during the greater part of his life.

The signs which first indicate failure of health are usually those of acute pleurisy. There is pain in the side, quick, sharp, startling. The term "stitch" in the side is commonly applied to this pain, and is expressive enough. After a time the pain becomes continuous, and when it subsides, suppressed breathing, or difficulty of filling the chest, is at once felt and recognised. This difficulty is due to the circumstance that a portion of lung has become adherent to the inner surface of the chest. The next sign indicating that the disease (consumption) is present, is, usually, vomiting of blood. In two-thirds of the examples to which my attention has been directed this has been the sign that has first caused serious alarm. It is commonly on this event that the physician is called in, who examines the chest with a stethoscope, and finds too often a condition that is hopeless. From the appearance of that sign all is down, down, down towards the grave.

There is no form of consumption so fatal as that from alcohol. Medicines affect the disease but little, the most judicious diet fails, and change of air accomplishes but slight real good. The sick man with this consumption may linger longer on the highway to dissolution than does his younger companion, but there is this difference between them, that the younger companion does often leave the highway to find a by-path to health,

while the other never leaves it, but struggles on straight to the end. In plain terms, there is no remedy whatever for alcoholic phthisis. It may be delayed in its course, but it is never cured, and not unfrequently instead of being delayed it runs on to a fatal termination more rapidly than is common to any other type of the disorder.

The origin of this series of changes from alcohol is, as you will perceive, in the membranes. The course of it is through the membranous tissues. The vessels give way after a severe congestive condition, and blood is exuded, or extravasated into the lung. There are here two diagrams in water tint, in which both these conditions are faithfully depicted, and to these is added a third, which shows in some, but in an imperfect manner, the course of the after destruction of the substances of the pulmonary organs.

Alcoholic Disease of the Heart.—The heart, not less than the rest of the vital parts, is subjected to deterioration of structure from alcohol. We need not wonder at this when we recall the strain to which it is subjected by the agent, the excess of work it is made to perform. I touched on the mechanical evils that befell the heart from these circumstances in my last lecture, and the structural evils which I have now to specify are not less grave. The membranous structures which envelope and line the organ are changed in quality, are thickened, rendered cartilaginous, and even calcareous and bony. Then the valves, which are made up of folds of membrane, lose their suppleness, and what is called valvular disease is permanently established. The coats of the great blood-vessel leading from the heart, the aorta, share not unfrequently in the same changes of structure, so that the vessel loses its elasticity and its power to feed the heart by the recoil from its detention, after the heart, by its stroke, has filled it with blood.

Again, the muscular construction of the heart fails, owing to degenerative changes in its tissue. The elements of the muscular fibre are replaced by fatty cells; or if not so replaced are themselves transferred into a modified muscular texture in which the power of contraction is greatly reduced.

Those who suffer from these organic deteriorations of the central or governing organ of the circulation of the blood learn the fact so insidiously, it hardly breaks upon then until the mischief is far advanced. They are for years conscious of a central failure of power from slight causes, such as over-exertion, harass, broken rest, or too long abstinence from food. They feel what they call "a sinking," but they know that wine or some other stimulant will at once relieve the sensation. Thus they seek to relieve it until at last they discover that the remedy fails. The jaded, over-worked, faithful heart will bear

no more; it has run its course, and the governor of the blood stream broken, the current either overflows into tissues, gradually damming up the courses, or under some slight shock or excess of motion ceases at the centre.

Other organic changes.—In the eyeball certain colloidal changes take place from the influence of alcohol, the extent of which have as yet been hardly thought of, certainly not in any degree studied, as in future they will be. We have learned of late years that the crystalline lens, the great refracting medium of the eyeball, may, like other colloids, be rendered dense and opaque by processes which disturb the relationship of the colloidal substance and its water. By this means even the lens of the living eye can be rendered opaque, and the disease called cataract can be artificially produced. Sugar and many salts in excess, in the blood, will lead to this perversion of structure, and after a long time alcohol acting in the manner of salt is capable, in excess, of causing the same modification. In the eyeball, moreover, alcohol injures the delicate nervous expanse upon which the image of all objects we have looked at is first impressed. It interferes with the vascular supply of this surface, and it leads to changes of structure which are indirectly destructive to the perfect sense of light.

In yet another mode alcohol perverts the animal mechanism. By some as yet obscurely definable interference with the natural transmutation of the colloidal substances into saline or crystalloidal, it gives rise to the production of an excess of some salines which appear in the fluid renal secretion. These saline matters accumulated in the blood from inability of the excreting organs to dispose of them, are directly injurious, and exist as possible causes for the promotion of cataractous changes in the crystalline lens, and varied changes in other of the colloidal tissues and membranes. They are also a cause of a disease local in character and produced by the very aggregation of saline product, particle by particle, into a compact mass like a stone. I refer to what is called calculus. In writing the history of one of the districts of England in which calculous disease is very prevalent, I expressed many years ago the view that alcoholic indulgence was one of the most telling agencies in the production of the malady. I have seen nothing since that would lead me to alter that statement.

Organic Nervous Lesions from Alcohol.—Lastly, the brain and spinal cord, and all the nervous matter become, under the influence of alcohol, subject. like other parts, to organic deterioration. The membranes enveloping the nervous substance undergo thickening; the blood-vessels are subjected to changes of structure, by which their resistance and resiliency is impaired; and the true nervous matter is sometimes modified, by

softening or shrinking of its texture, by degeneration of its cellular structure, or by interposition of fatty particles.

These deteriorations of cerebral and spinal matter give rise to a series of derangements, which show themselves in the worst forms of nervous disease—epilepsy; paralysis, local or general; insanity.

But not a single serious nervous lesion from alcohol appears without its warning. As a man who, when drinking at the table, is warned that the wine is beginning to take decisive effect on his power of expression and motion by certain unmistakable indications, so the slow alcoholic is duly apprised that he is in danger of a more permanent derangement. He is occasionally conscious of a failing power of speech: in writing or speaking he loses common words. He is aware that after fatigue his limbs are unnaturally weary and heavy, and he is specially conscious that a sudden fall of temperature lowers too readily his vital energies. The worst sign of impending nervous change is muscular instability, irrespective of the will; that is to say, an involuntary muscular movement whenever the will is off guard. This is occasionally evidenced by sudden muscular starts which pass almost like electrical shocks through the whole of the body; but it is more frequently and determinately shown in persistent muscular movements and starts at the time of going to sleep. The volition then is resigned to the overpowering slumber, and properly all muscular movement, except the movement of the heart and of the breathing, should rest with the will. But now this beautiful order is disturbed. In the motor centres of the nervous organisation the foreign agent is creating disturbance of function. The fact is communicated to the muscles by the nervous fibres, and the active involuntary start of the lower limbs rouses the sleeper in alarm. Ignorant of the import of these messages of danger, the habituated alcoholic continues too frequently his way, until he finds the agitated limbs unsteady, wanting in power of co-ordinated movement—paralysed.

Deeply interesting as these phenomena from alcohol are, I must leave them here, omitting many others equally significant and equally plain, when they are once pointed out, even to the unprofessional mind. Let it be understood that in each description I have recorded only what alcohol can physically do to the animal economy. It is not always the cause of all or any of these phenomena. They may be induced by other influences and other agents, but it is an agency capable of effecting them, and it is actively employed in the work.

On some of the Mental Phenomena induced by Alcohol.—The purely physical action of alcohol has been so far treated upon in the preceding pages. To that must now be added a few

sentences on the influence this agent exerts over the mental functions. Of course, such influence is actually manifested by and through physical means, but as yet these are not sufficiently clear to enable us to trace out the mental aberration through the physical process that has led to it. It is better, therefore, and simpler to treat the present subject in the mere abstract, passing from the agent to its results, without reference to the intermediate line of connection between cause and effect. These mental phenomena, in the chronic phase, correspond to the phenomena which belong to the second and third stages of acute alcoholic intoxication.

Loss of Memory and Speech.—One of the first effects of alcohol upon the nervous system in the way of alienation from the natural mental state is shown in loss of memory. This extends even to forgetfulness of the commonest of things; to names of familiar persons, to dates, to duties of daily life. Strangely, too, this failure, like that which indicates, in the aged, the era of second childishness and mere oblivion, does not extend to the things of the past, but is confined to events that are passing. On old memories the mind retains its power; on new ones it requires constant prompting and sustainment.

If this failure of mental power progress, it is followed usually with loss of volitional power. The muscles remain ready to act, but the mind is incapable of stirring them into action. The speech fails at first, not because the mechanism of speech is deficient, but because the cerebral power is insufficient to call it forth to action. The man is reduced to the condition of the dumb animal. Aristotle says grandly, animals have a voice; man speaks. In this case the voice remains, the speech is lost; the man sinks to the lower spheres of the living creation, over which he was born to rule.

The failure of speech indicates the descent still deeper to that condition of general paralysis in which all the higher faculties of mind and will are powerless, and in which nothing remains to show the continuance of life except the parts that remain under the dominion of the chain of organic or vegetable nervous matter. Our asylums for the insane are charged with these helpless specimens of humanity. The membranes of the nervous centres of thought and volition have lost, in these, the dialysing function. In some instances, though less frequently than might be supposed, the nervous matter itself is modified visibly in texture. The result is the complete wreck of nervous action, the utter helplessness of will, the absolute dependence upon other hands for the very food that has to be borne to the mouth. The picture is one of breathing death; of final and perpetual dead drunkenness.

Dipsomania.—A second effect of alcohol on the mental organisation is the production of that craving for its incessant supply, to which we give the name of dipsomania. In those who are affected with this form of alcoholic disease a mixed madness and sanity is established, in which the cunning of the mind alone lives actively, with the vices that ally themselves to it. The arrest of nervous function is partial, and does not extend to the motor centres so determinately as to those of the higher reasoning faculties. But the end, though it may be slow, is certain. And the end is, as a rule, that general paralysis which I have just described. The dipsomaniac is, however, capable of recovery within certain limits on one, and only one, condition, that the cause of his disease be totally withheld.

Mania a potu.—The effect of alcohol on the mental functions is shown in yet another picture of modern humanity writhing under its use. I mean in the form of what may be called intermittent indulgence, to dangerous excess. This form of disease has been named the *mania a potu*, and it is one of the most desperate of the alcoholic evils. The victims of this class are not habitual drunkards or topers, but at sudden intervals they madden themselves with the spirit. They repent, reform, get a new lease of life, relapse. In intervals of repentance they are worn with remorse and regret; in the intervals of madness they are the terrible members of the community. In their final excitement they spread around their circle the darkness of desolation, fear, and despair. Their very footsteps carry dread to those who, most helpless and innocent, are under their fearful control. They strike their dearest friends; they strike themselves. Retaining sufficient nervous power to wield their limbs, yet not sufficient to guide their reason, they become the dangerous members of our community, whom our legislators, fearing to touch the cause of their malady, would fain try to cure by scourge and chain.

To us physiologists these "maniacs a potu" are men under the experiment of alcohol, with certain of their brain centres (which I could fairly define to you if the occasion were befitting) paralysed, and with a broken balance, therefore, of brain power, which we, with infinite labour and much exactitude, have learned to understand. Our remedy for such aberration of nervous function, if we were legislators, would be simple enough; we should not whip the maniac back again to the potu; we should try to break up the mania by taking the potu from the maniac. But, then, we are only physiologists. We have nothing to do with that £117,000,000 of invested capital, and we are not practical in reference to it.

Transmitted Disease.—The solemnest fact of all bearing upon these mental aberrations produced by alcohol, and upon

the physical not less than the mental, is, that the mischief inflicted on man by his own act and deed cannot fail to be transferred to those who descend from him, and who are thus irresponsibly afflicted. Amongst the many inscrutable designs of nature none is more manifest than this, that physical vice, like physical feature and physical virtue, descends in line. It is, I say, a solemn reflection for every man and every woman, that whatever we do to ourselves so as to modify our own physical conformation and mental type, for good or for evil, is passed on to generations that have yet to be.

Not one of the transmitted wrongs, physical or mental, is more certainly passed on to those yet unborn than the wrongs which are inflicted by alcohol. We, therefore, who live to reform the present age in this respect, are stretching forth our powers to the next; to purify it, to beautify it, and to lead it towards that millennial happiness and blessedness which, in the fulness of time, shall visit even the earth, making it, under an increasing light of knowledge, a garden of human delight: a Paradise regained.

Summary.—In summary of what has passed, I may be briefness itself.

This chemical substance, alcohol, an artificial product devised by man for his purposes, and in many thinks that lie outside of his organism a useful substance, is neither a food nor a drink suitable for his natural demands. Its application as an agent that shall enter the living organisation is properly limited by the learning and skill possessed by the physician—a learning that itself admits of being recast and revised in many important details, and perhaps in principles.

If this agent do really for the moment cheer the weary, and impart a flush of transient pleasure to the unwearied who crave for mirth, its influence (doubtful even in these modest and moderate degrees) is an infinite simal advantage, by the side of an infinity of evil for which there is no compensation, and, while the evil is promoted from its root, no human cure.—*London Medical Record, Feb.* 10, 1875, *p.* 77; *Medical Press and Circular, March* 17 *and* 31, 1875, *pp.* 224, 265.

96.—ON JABORANDI.

By Dr. WALTER G. SMITH, Assistant Physician to the Adelaide Hospital, &c., Dublin.

In the early part of last year Prof. Gubler, of Paris, received from Dr. Coutinho, of Pernambuco, a limited supply of a Brazilian drug bearing the above title.

Its remarkable, and indeed unique, diaphoretic and sialo-

gogue properties have attracted considerable attention, not only in France, but also in this country; and although the provings made with it have been few as yet, the concordance in the results noted by different observers is very striking. It seems that we have got possession of a drug which uniformly and distinctly exercises a powerful primary sudorific influence, and that, in the hitherto vague and uncertain class of diaphoretics we can now reckon at least one medicine whose action in promoting the cutaneous exhalation appears to be undeniable.

In investigating a new drug it is essential, in the first place, to determine with accuracy its botanical origin, and to be assured of the identity of the samples which fall into the hands of different experimenters.

The names *jaborandi* and *jamborandi* appear to be generic terms commonly used in Brazil to designate stimulant, sudorific, and sialogogue plants. From an examination of the specimens furnished by Dr. Coutinho, with the Brazilian plants in his own herbarium, Prof. Baillon was led to identify jaborandi with Pilocarpus pinnatifolius (Lemaire), N. O. Rutaceæ.

Some doubt was entertained as to the correctness of this opinion, but strong confirmation of its substantial accuracy is afforded by Mr. E. M. Holmes, who has carefully described the botanical characters of a specimen of Pernambuco jaborandi obtained through Messrs. Hearon, Squire, and Francis, and he concludes that it is derived from a species of Pilocarpus, probably P. pinnatifolius. On this point certainty cannot be arrived at until the flowers are examined. The drug, as imported at present, consists of the broken leaflets of a large impari-pinnate leaf, which is dotted with a number of pellucid glands.

The odour is very characteristic, and resembles that of a mixture of Indian hemp, matico, and cubebs. When chewed the taste is piquant, and excites a sensation of glowing heat on the tongue, like that caused by pellitory root—(Martindale.) *Dublin Journal of Medical Science, March* 1875, *p.* 231.

97.—ON JABORANDI.

By Dr. Sydney Ringer and Dr. Alfred P. Gould.

This active and interesting drug, long in use in South America, was lately brought from Pernambuco to Paris by Dr. Continho. Dr. Gubler and M. Rabuteau confirm Dr. Continho's statement concerning its powerful diaphoretic and sialagogue properties. The dose for an adult is sixty to ninety grains, infused in boiling water. Dr. Continho recommended that the patient should drink the infusion with the suspended leaves,

and then go to bed and cover himself with warm clothing. In about ten minutes the face, ears, and neck become deeply flushed; then soon drops of perspiration break out over the body, and at the same time the mouth waters; in a short space the perspiration rapidly increases, the sweat running down the body and soaking the clothes, whilst the salivation becomes profuse, running from the mouth sometimes in an almost continuous stream. In three of our cases the saliva amounted to an imperial pint, 22 oz., and 27 oz. respectively. The sweating and salivation continue from two to four or five hours, and simultaneously decline. Dr. Gubler has shown that the drug increases the bronchial secretion, and he further asserts that it sometimes produces diarrhœa. In a communication concerning the action of this medicine on some lads between the ages of eight and twelve lately published in the Practitioner, we confirmed these statements, with the exception of that relating to diarrhœa, and drew attention to the influence of this drug on the temperature, pulse, brain, &c. During the sweating we found that the temperature fell about one degree, the reduction persisting for the rest of the day; and that the lowest temperature was reached about an hour and a half after the administration of the medicine. In one case the fall began immediately, in another case in forty minutes, and in another instance in eighty minutes. In each experiment the pulse became considerably quicker, the increase varying from forty to fifty beats, the beats being quickest in from twenty-five to eighty minutes after the dose. The quickened pulse continued more than four hours. In one lad with intermittent pulse the medicine entirely removed this irregularity. The drug often produced nausea or sickness, which occurred two or three hours after taking it; it also occasioned considerable drowsiness, the lads falling asleep during the observations. The flushing of the face was noticed only when sweating occurred; and in a short time the flushing was succeeded by marked pallor, accompanied by some prostration. We tried to show that probably the fall of temperature was due to the perspiration and to increased radiation of heat from an increased quantity of blood flowing to the skin.

Our later observations prove a marked antagonism between jaborandi and belladonna. Belladonna checks the secretion from the skin, the salivary glands, the mucous membrane of the nose, bronchial tubes, stomach, and intestines, and dilates the pupil and contracts the arterioles; jaborandi, on the other hand, increases enormously the perspiration and saliva, and, in a much less degree, the secretion from the mucous membrane of the nose, the bronchial tubes, and the stomach and intestines. Robin asserts, moreover, that it lowers arterial tension, pro-

bably by paralysing the vaso-motor nerves, and thus causing dilatation of the arterioles. Belladonna excites delirium, whilst jaborandi often produees sleep. This antagonism was well displayed in four instanees. On three occasions, to three different men, we administered sixty grains of jaborandi, and when the perspiration and salivation were profuse we injected subcutaneously $\frac{1}{100}$ of a grain of atropia. In five minutes the perspiration and salivation were considerably diminished, and in from ten to twelve minutes the skin was preternaturally dry and the salivation was ehecked, but in one case eontinued a little after the eessation of the perspiration. It euriously happened that a lad was admitted into University College Hospital poisoned by atropia. He had taken one grain of the alkaloid five hours before treatment. His tongue and mouth were quite dry. A quarter of an hour after taking thirty grains of jaborandi his mouth beeame much less dry and in an hour he was sweating freely and his mouth was naturally moist.

Belladonna, it is well known, arrests the secretion of milk, and we were anxious to ascertain whether jaborandi was antagonistic to belladonna in respeet to its influence on this secretion. We administered thirty grains of jaborandi to a woman thirty-eight years old, confined of her ninth ehild four months previously. During suckling she had very little milk, and the quantity had beeome much less of late. We gave her the medicine at 10 a.m. She had suekled her child seven hours before. In ten minutes the drug produeed its usual symptoms; in half an hour her breasts, which previously were flaeeid, became tumid and distended, and on pressure yielded eonsiderably more milk. In forty minutes the inerease was still more marked, jetting forth in four or five streams. In eighty minutes the milk was less abundant, though eonsiderably more so than before the experiment. The woman herself noticed the deeided inerease of her milk. To another woman, aged twenty-five, whose child is thirteen months old, we gave two doses of thirty grains, as the first had no effeet. She emptied her left breast every ten minutes by pressure, and eaeh of the three first emptyings yielded 40 minims. As soon as perspiration and salivation beeame free the quantity rose to 80 minims. The next time yielded 100 minims, the following 155 minims, the next time 80 minims. The salivation and perspiration at this time eeased. The next observation yielded 125 minims, the next 87 minims, the next 70 minims, and the last 40 minims. This woman, whose case is not ineluded in those given before, eomplained of severe pain over the pubes, with desire to urinate, the pain immediately ceasing after micturition.

In some of their effects, however, jaborandi and belladonna agree. Thus, both flush the face and quicken the pulse; and both affect children much less than adults. Belladonna quickens the pulse by its paralysing influence on the pneumogastric, and possibly by stimulating the sympathetic nerves. We have no evidence that jaborandi paralyses the pneumogastric, or stimulates the sympathetics supplying the heart, but M. Robin has shown that it lessens arterial tension, probably by dilating the arterioles; and it is well known that dilating the arterioles, and thereby allowing the blood to pass more quickly from the arteries to the veins, quickens the heart-beats. Hence it is very probable that the quickening of the pulse by jaborandi is due to its influence on the arterioles; and thus, instead of affording an instance of similarity of action between these two drugs, affords another example of their antagonism, for belladonna contracts the arterioles. While referring to the relations of these two drugs, we may point out that both sometimes affect the bladder. Jaborandi, as we have seen, causes pain over the pubes, with desire to pass water, the pain subsiding when the bladder is emptied. These facts render it probable that jaborandi causes contraction of the bladder, for it does not augment the quantity of the secretion.—*Lancet, Jan.* 30, 1875, *p.* 157.

98.—RHAMNUS FRANGULA AS A SUBSTITUTE FOR CASTOR OIL.

By Dr. J. C. Ogilvie Will, Assistant-Surgeon to the Aberdeen Royal Infirmary.

[There are certain objections to castor oil as an aperient, but whether it will ever be superseded by any aperient possessing all its advantages without its disadvantages is questionable. The rhamnus frangula is however an aperient for which the writer claims these desirable properties.]

The advantages of castor oil as a mild purgative when compared with others used for a like purpose are so well known that it is almost unnecessary to recapitulate them; but, for the sake of comparison, it may be as well to call them to mind, and they may be summed up in the following few words:—Certainty and rapidity of action; little griping and no constitutional disturbance; the production of thin fæculent, not watery, stools; and general applicability.

The main disadvantage is its disgusting flavour; also the nausea which this frequently induces, and the disagreeable eructations which follow its ingestion, disguise it in whatever way one can; even when given enclosed in capsules, the eructa-

tions, after the rupture of the gelatine film takes place, cause loathing and disgust.

The medicine to which I now desire to direct attention is *Rhamnus frangula*. To prevent those who are not acquainted with *R. frangula* from falling into an error which I have already witnessed, let me state that the shrub I speak of is not the common buckthorn or *Rhamnus catharticus*, but the black alder or *R. frangula*, and that the former differs as widely from the latter in the effects it produces as does croton oil from castor oil —the one being an active cathartic, causing nausea, dryness of the throat, thirst, and tormina; the other a mild laxative, its action being unaccompanied by griping or other disturbing symptoms.

The part of *Rhamnus frangula* used is the bark, and the preparation I have always prescribed has been a fluid extract, each fluid drachm of which contains an equivalent of one drachm of the bark. This extract is a dark brown thickish fluid, with a rather sweetish and far from disagreeable taste. The dose of course varies according to the effect desired, the age, and the condition of the patient; but I have proved from experience that the quantity suggested by the makers of the extract—viz., one to two drachms—is, as a rule, too small for an adult. For a child one drachm is sufficient, but for an adult a dose of from two and a half—that is, an average dessert-spoonful—to five drachms is necessary, and I generally order the following: ℞. Extracti rhamni frangulæ liquidi ʒ v., aquæ ad ℥ j., M. sig.; the half to be taken in a wineglassful of cold water, and should the bowels not move in four hours the remainder to be given; or the first dose at night, and the second in the morning should no motion have taken place. The effects are much akin to those I have mentioned as the advantages of castor oil, but there is no nausea, there are no eructations, and there is no griping. With regard to the last symptom, though it is, as I have already stated, but slight in the case of castor oil, it is hardly ever present here in even the least degree, only one patient of the many to whom I have given it complaining of it at all, and in her case the bowels had not been opened for four days, and she had only a very little uneasiness. The stools are not generally loose, and never watery; it usually acts only once, but in two of my cases three motions followed five drachms. It seems to have, in addition, as first stated by Mr. Giles, tonic and aromatic qualities, by which the muscular action of the bowels is slightly stimulated; and it is probably to this that its usefulness in habitual constipation is to be attributed. I have now prescribed it in many different forms of disease, and in all it has answered well. I think that it will prove particularly useful in children; in those

suffering from hemorrhoids, or other affections of the rectum; after surgical operations about the pelvis or abdomen; in inflammatory or spasmodic diseases of the genito-urinary organs; in pregnant and puerperal females; or, to quote the words of Christison when speaking of oleum ricini, "in all circumstances where it is desirable to move the bowels gently without occasioning local irritation or general disturbance."—*Medical Times and Gazette, Feb.* 6, 1875, *p.* 141.

99.—ON CHLORAL.

By Dr. WALTER G. SMITH, Assistant Physician to the Adelaide Hospital, Dublin.

In Pharmacy.—Mr. R. Fairthorne suggests the subjoined formulæ, based on the considerable powers as a solvent which chloral possesses. Glycerin affords a convenient agent for forming solutions with chloral and the alkaloids, and the following will be found, when properly combined, to produce permanent and elegant preparations, viz.:—

Chloral Glycerite of Morphia.—℞. Morphia (powd.) 5 grains; chloral hydrate, 1 drachm; glycerin, half a fluid ounce. M. Sec. art.

Chloral Glycerite of Veratria.—℞. Veratria, 5 grains; chloral hydrate, 1 drachm; glycerin, half a fluid ounce. M. Sec. art.

Ointment of Chloral and Veratria.—(Corresponding in strength to the Ung. Veratriæ, U. S. P.)—℞. Veratria, 10 grains; chloral hydrate, ʒ i; water, 6 drops; lard ointment, half an ounce. M. Sec. art.

Chloral Glycerite of Morphia and Camphor.—℞. Morphia, 5 grains; chloral and camphor, each 1 drachm; glycerin, half a fluid ounce. M.

Lotion of Chloral and Iodine.—℞. Iodine, 20 grains; iodide of potassium, 6 grains; glycerin, 1 fluid ounce; chloral hydrate, 2 drachms. M. Sec. art.

"Chloral can also be combined with collodion, in which it dissolves after the addition of a few drops of alcohol."

A solution, consisting of 9 parts of hydrate of chloral and 3 of water, is capable of dissolving the following substances to the extent named:—

One grain of morphia is dissolved by a portion of the liquid containing 12 grains of the hydrate; 1 grain of veratria by a portion containing 5 grains; and 1 grain of atropia by a portion containing 20 grains. These substances should be mixed,

in the state of powder, with the solvent, and heated by means of a water bath, with occasional agitation. The solutions thus made are in a convenient form for employment, either alone or when mixed with oils, ointments, or with glycerin. Camphor, too, is freely dissolved by them.—(Phar. Jour., Dec. 26, from Amer. Journ. of Pharm.)

Action on the Blood.—Feltz and Ritter have made some interesting observations upon this subject, but which are too lengthy for insertion here. Their conclusions are quoted from the Comptes Rendus, Aug. 3, in Rép. de Pharm., 10 Sept., and in Lond. Med. Rec., Aug. 26.

Some months since M. Vulpian communicated to the Académie de Médecine the result of numerous experiments on the intra-venous injections of chloral, which he had performed with the object of keeping the animals quiet, and so facilitating vivisections. In three instances out of sixty M. Vulpian has observed a very serious accident, which it behoves those surgeons who advocate the intra-venous injection of chloral in man to consider. In three dogs he found that considerable hæmaturia supervened during the injection. (Feltz and Ritter ascertained that the urine of dogs contained hæmatoglobin in solution after intra-venous injection of chloral). After death no lesion of the urethra, bladder, or ureters was found, but the bladder and ureters were full of blood, which was derived from the congested kidneys. This hæmaturia is produced by the rapid elimination of the chloral. M. Vulpian asks, and rightly so, may not the intra-venous injection of this drug in man determine similar phenomena, and he is unable to recommend surgeons to practise such injections.—(Journ. des Connaiss. Méd., 15 Juin, 1874).

In Hydrophobia.—An interesting case is recorded in the Rép. de Pharm., 10 Juillet, 1874, in which *thirty-three grammes* of hydrate of chloral (13 grms. at first and 20 grms. on the day following) were injected into the veins of a man, aged thirty-one, suffering from hydrophobia, which he had contracted from the bite of a dog six weeks previously. Each injection of chloral was followed by sound sleep, and the man died shortly after in a paroxysm of orthopnœa. The autopsy was made forty-eight hours after death, and general visceral congestion was noted. But, although the veins were minutely examined with great care, no trace of a thrombus or embolus was found.

The case is curious, as showing what a large quantity of an active and irritating drug can be introduced into the course of the circulation without inducing coagulation of the blood.—*Dublin Journal of Medical Science, March* 1875, *p.* 240.

100.—CROTON CHLORAL.

Dr. R. Engel states that according to Liebreich, croton chloral, administered internally, rapidly produces slumber similarly to ordinary chloral, but without its use being followed, as in the case of the latter, by lowering of the pulse and respiration. Even after the administration of very high doses of croton chloral the pulse is not reduced. The author thinks that it is not to the first product of decomposition (allyl-chloroform) that hypnotism is due. Allyl-chloroform, being very unstable, breaks up immediately, and he thinks therefore the action of croton chloral should be attributed to bichlorallylene. Moreover, Liebreich has found that bichlorallylene, when administered to animals, does not reduce the circulation or respiration. Comparing the effects of chloroform and chloral on the one hand, and bichloride of ethylene and bichlorallylene on the other, he considers himself justified in asserting that whilst the trichlorinated substances act upon the brain, spinal cord, and heart, the bichlorinated substances act only upon the brain and spinal cord. In none of his experiments has Liebreich recognised any hurtful effects on the stomach or any other organs; and he reports that he has employed it very successfully in cases of facial neuralgia, the pain ceasing frequently before sleep is produced. Jules Worms, however, asserts that croton chloral is not so generally tolerated as chloral, and George Gay says that its narcotic action is more uncertain. Croton chloral is hypnotic in doses of from 7 to 15 grains. It may be administered in solution in water, or in glycerine. The following is the formula employed by Jules Worms:—

Croton chloral, 1 gramme; glycerine, 60 grammes; water, 60 grammes; oil of peppermint, 3 drops; simple syrup, 25 grammes.

In a paper contributed to the American Practitioner by Mr. Louis Diehl, of Louisville, he remarks that croton chloral hydrate differs from the ordinary chloral hydrate by its sparing solubility in cold water, and in the exceedingly irritant character of its vapour. Chloral hydrate, on the contrary, is freely soluble in water, and its odour when pure is not irritating. From these experiments it follows that croton chloral hydrate (commercial) may be dispensed in aqueous solution of a strength corresponding to two grains in the fl. drachm, and Mr. Diehl gives the following formula:—

℞. Croton chloral hydrate, gr. viij; warm water, fl. ℥j; simple elixir, fl. ℥ vij. Ft. solut.

Owing to the alcohol contained in the simple elixir, a larger quantity than two grains to the fl. drachm could, if desirable, be incorporated and held in solution by the above mixture.—*Practitioner*, *Dec.* 1874, *p.* 448.

101.—THE DANGERS OF ANÆSTHETICS.

By Joseph T. Clover, Esq. London.

[The danger of chloroform and the comparative safety of ether having been brought to notice by Mr. George Pollock in the Lancet, Mr. Clover writes :]

I regard ether as much less dangerous than chloroform as they are generally given; for although I feel as confident in giving a proportion of thirty-three minims of chloroform to a thousand inches of air, as I should in giving ether, I have seldom given a stronger dose without noticing that it caused too much depression of the heart's action. Even this proportion, if inhaled by several deep inspirations, is liable to cause such depression, that if the pulse were not kept under observation, and the chloroform removed or diminished, it might, I believe, cause death. It is, I think, greatly to the credit of the profession that deaths from chloroform are not more frequent, for besides its liability to cause choking and apnœa, which are remediable, it may produce total arrest of the heart's action, which is not so.

The mixture termed "bichloride of methylene" is never sold without containing a considerable quantity of chloroform, and as it is much less volatile than the other ingredients, it escapes less readily. A bottle not very well stopped, or frequently opened, will contain an increasing proportion of chloroform. A flannel used for several patients without being dried will have a larger proportion of chloroform than at first. Mixtures of ether and chloroform would long since have been favourite anæsthetics but for this circumstance. It is obvious to all that we cannot safely give strong chloroform vapour as we can ether, and therefore the larger the quantity of chloroform in the mixture the greater the need of caution.

I am not aware of the evidence that "methylene bichloride" is safer than chloroform. Considering that chloroform is found in almost every surgery and druggist's shop in the country, and that the methylene is both expensive and, on account of its volatility, a great deal wasted, I think the number of patients who have inhaled it must be very small compared with those that have taken chloroform.

Ether is so much less liable to arrest the movement of the heart, that if there were not some serious objection to its use, chloroform would not have been so quickly established in its place. The excitement of a small quantity—the choking produced by its free use, and the subsequent intoxication are the chief reasons against it. These may be almost entirely got rid of by improved methods of administration. I have tried many

ways of giving ether, but have always found more resistance to breathing it than chloroform until I made use of nitrous oxide to render the patient partially unconscious, and to assist the action of the ether.

Of nitrous oxide I think it may be said that it is the most pleasant of our anæsthetics, that although it destroys animal life it always stops the breathing some time before it stops the heart, and that if the chest is moved enough to admit a very little air into the lungs, natural breathing returns more quickly than when it ceases from other causes. It is very rapid in its action, especially on children, and for tenotomy, reducing dislocations, moving stiff joints, and extracting teeth, it is unequalled. But it is not fitted for operations that require that the patient should be still for five minutes. Convulsive twitchings and delirium of a boisterous character are apt to occur. The combination of gas with ether modifies beneficially the character of both.

My first plan was to give gas as usual, and when insensibility occurred, to apply the ether inhaler. It sometimes answered well; at others it produced much choking, or else allowed the patient to recover partially and struggle. My next plan was to turn the current of gas, and make it pass through a vessel of ether as soon as the patient was made unconscious by pure gas. This succeeded better so far as getting the first supply of ether into the system, but after it became necessary to admit air, I could not supply the bag with ether with sufficient accuracy. It answered well for increasing the anæsthesia of gas when a long dental operation had to be performed, but for surgical operations generally it was not satisfactory.

The plan I now adopt is this: I give nitrous oxide only at first, and by degrees: without removing the face-piece, I turn a stop-cock, which allows a portion of gas, during expiration, to pass through a vessel containing ether, into an india-rubber bag, exactly like the supplemental bag; at the next inspiration this gas returns, bringing with it a portion of ether vapour, and mixes with the pure gas coming from the gas-bag, As the way to the ether is opened, the way to the gas-bag is closed. As soon as the ether begins to be supplied the tap of the gas bottle may be screwed tightly, and the escape-valve closed.

In turning on the supply of ether, I watch for signs of its irritating the throat, and if it excites coughing or swallowing, I turn back the ether, to lessen its pungency.

The patient is usually ready for the operator in sixty seconds; if any air gets between the face-piece it may require two or three minutes. As soon as the least stertor is heard, or any convul-

sive twitchings of the limbs is visible, I cautiously admit a little air, and keep supplying as much ether as I can without exciting cough. After about two minutes I remove the face-piece every fifth or sixth inspiration, unless, on account of air getting under the face-piece, the patient remains in a satisfactory state of coma without it. After a certain amount of ether has been taken, the inhaler may be held so lightly as to admit a considerable quantity of air under the face-piece, but it is not often well to remove the inhaler altogether till the end of the operation.

On recovery, although there is usually some excitement, and occasionally hysterical symptoms, they pass away the sooner because there is less ether in the body to be thrown off.

I rarely notice the tracheal rhonchus which is common when etherisation is kept up for as long as a quarter of an hour in the usual way. The instrument was made by Mayer and Meltzer.

Those who have the gas inhaler with supplemental bag, which I introduced six years ago, will find a substitute for this apparatus by merely putting several pieces of sponge into the supplemental bag and pouring two or three ounces of ether into them. The material of this bag should be etherised india-rubber. Of course, it must be so arranged that liquid ether cannot be drawn into the face-piece.

There are few operations that this instrument is not suited for, where the head of the patient is in such a position that the nose and mouth can be covered over by the face-piece. In some delicate operations upon the eye I should still prefer chloroform, as it causes less bleeding, and in operations about the mouth and nose I should give ether freely at first, and then give chloroform during the operation, if it was one of long duration. The best way of giving chloroform in these difficult cases is beyond the scope of the present letter.

I have given ether after gas in more than 900 cases, and in more than 700 I have used this apparatus. The majority have been dental cases too prolonged for the use of gas alone, but they include all the most severe surgical operations, and some of suspected fatty degeneration of the heart. No death occurred. I have not wanted to draw forward the tongue.

I resorted to artificial respiration twice: In one of these cases sickness followed, but the other recovered better than from a full dose of chloroform. I have also compressed the sternum with one hand on three or four occasions, when I thought the breathing ineffective. Vomiting is rare, unless when food has been taken within four or five hours. When it has happened it has been in no instance a source of danger.—*Lancet, Jan.* 2, 1875, *p.* 32.

102.—ON THE DANGERS ATTENDING THE USE OF ANÆSTHETICS.

By the EDITOR of the LANCET.

The dangers of anæsthesia, so far as we understand them, are death beginning at the lungs, and death beginning at the heart. When a rabbit or other small animal is killed by chloroform, its death begins at the lungs. It perishes by asphyxia; and, after apparent death, which would pass into real death save for the aid of art, it may, as Dr. Richardson has shown, be easily resuscitated. The same condition has more than once been produced in the human subject, and Ziemssen and others have recorded cases in which, by faradisation of the phrenic nerve, or by other methods of maintaining respiration, life has been restored rather than preserved. We think it probable that death beginning at the lungs might be occasioned by ether, and that, if improperly treated, it might become death real and irretrievable. All such cases, however, would probably be remediable if taken in time; and would require nothing but the methodical conduct of artificial respiration. With chloroform and bichloride of methylene there is also the danger of death beginning at the heart, by a sudden paralysis over which the respiration exerts no influence; and it is probable that such cases are always fatal. From this risk it may, perhaps, be said that ether is wholly free; for there is a remarkable concurrence of testimony with regard to its power to sustain the heart, and also, by maintaining dilatation of the capillaries, to prevent the heart from being overloaded by blood driven in from elsewhere. We should hesitate to admit with the Americans that ether is absolutely safe; but we are prepared to believe that any small dangers which may attend upon it are under the control of vigilance and good management. With regard to chloroform the same cannot be said; and, as long as its employment is continued, it will continue to claim its occasional victims. It is surely incumbent upon every surgeon to guard the life of his patients, and to keep himself in the right, by the systematic employment of the anæsthetic which, so far as knowledge now extends, is at once as effectual as any other and more safe.—*Lancet*, *Jan.* 30, 1875, *p.* 169.

103.—ETHER v. CHLOROFORM.

By R. BRUDENELL CARTER, Esq., and J. WARRINGTON HAWARD, Esq.

[Mr. Carter writes to the Lancet as follows:]

At the International Congress of Ophthalmologists, held in London in 1872, Dr. Joy Jeffries, of Boston, U.S.A., read a

paper in which he strongly advocated the use of ether, and he did so on the twofold ground that chloroform is dangerous to life, while ether is *absolutely safe*, and that there should be no deaths in ophthalmic surgery. In the debate which followed I said that, unless my memory deceived me, there had been deaths from ether, and that ether did not produce sufficient muscular relaxation for operations upon the eye. Dr. Jeffries rejoined that the supposed deaths from ether had been fully investigated in America, and had all been traced to other causes; that it would be impossible to destroy human life by ether vapour except negatively, by depriving the patient of air; that any practitioner in America who had a fatal case of chloroform administration would almost certainly be convicted of manslaughter; and that imperfect muscular relaxation depended upon an imperfect method of administration. Upon this I invited him to come and administer ether at St. George's, and when he did so I operated upon several patients to my entire satisfaction; in one case extracting senile cataract from both eyes, without the smallest degree of reflex muscular contraction being produced. Since that time I have almost discarded chloroform and bichloride of methylene, both in hospital and in private practice, and, for adults, use ether as my sole anæsthetic. The ophthalmic operations at St. George's are probably equal in number to all the others put together; and an experience of two years and a half has neither given us a single case of imperfect action nor produced a single unfavourable or alarming symptom. The secret of administration is to give ether enough, and to exclude external air until insensibility is produced. We sometimes use chloroform for young children, who generally take it kindly, and we sometimes give a few whiffs of chloroform to render irritable air-passages insensitive to ether, but that is all. The contrast between the effects of the two agents is very striking. An old patient, brought deeply under chloroform, generally becomes very pallid and bathed in sweat; but the same patient under ether would have a flushed face, and would be sustained and stimulated instead of being depressed.

Shortly before the reading of the paper to which I have referred, it was my misfortune to administer chloroform to a robust, healthy girl of seventeen, who died under its influence during an operation for strabismus. Within a week of her death two others took place in London under similar circumstances, one in the ophthalmic department of a general hospital, and one in the private house of an ophthalmic surgeon. I feel very strongly that these events ought not to recur. Chloroform and bichloride of methylene have no advantage over ether, except that they act a little more quickly; and the

gain of a few seconds affords no justification for the sacrifice of human life. It seems to me that surgeons who persist in the administration of the possibly deadly agents incur responsibilities which should not be lightly undertaken in the face of better knowledge. At a coroner's inquest the question, "Would not this result have been avoided by the use of ether?" would not only be difficult to answer at the time, but it might lead to subsequent complications of a painful character.

[Mr. J. WARRINGTON HAWARD writes upon the same subject:]

An examination of the fatal cases of chloroform inhalation shows the mode of death to have been almost invariably by failure of the heart's action, and this failure is generally sudden.

Now, the committee appointed by the Royal Medical and Chirurgical Society to investigate the effects of chloroform found that "the simple failure of respiration, whilst the circulation remains good, almost always betokens a recoverable condition;" but that "the failure of the circulation to any considerable extent always involves extreme peril;" and "after the heart has stopped, recovery is but just possible, and is by no means the usual result of attempts to resuscitate." So that the danger from chloroform is precisely of that kind which it is most difficult to guard against, and which is most hopeless when it occurs. On the other hand, the same committee state that ether vapour stimulates the heart's action, and that the pressure in the vessels is maintained until there has been a manifest failure of the breathing. And Dr. Snow proved that it was impossible to paralyse the heart by ether inhalation. It is this stimulating property which gives to ether its greater safety, and enables us to use it not only as an anæsthetic, but as an antagonist to the shock of an operation. Under the influence of ether, as I have often pointed out, the patient may have a better pulse after than before even a severe operation. Besides this, he is saved the distressing depression which so often follows the inhalation of chloroform; and persons who have inhaled both ether and chloroform have several times expressed to me the great difference they have experienced in this respect from the two drugs.

This, and the absence of after-sickness (another of the advantages of ether), have been, and especially, noticeable in several cases of ovariotomy for which I have administered ether.

It is needless to point out how great an advantage it is to those who, without any special experience, are called upon to give an anæsthetic, to be able to use one so free from danger as

is ether. Indeed, in an emergency, a patient, after being rendered insensible by ether, may be safely kept under its influence by an unskilled assistant.

Moreover, when a person has been fully narcotized by ether, its anæsthetic effects last much longer than chloroform, so that a considerable operation, such as removal of the upper jaw-bone, may be performed without the necessity for renewing the inhalation.

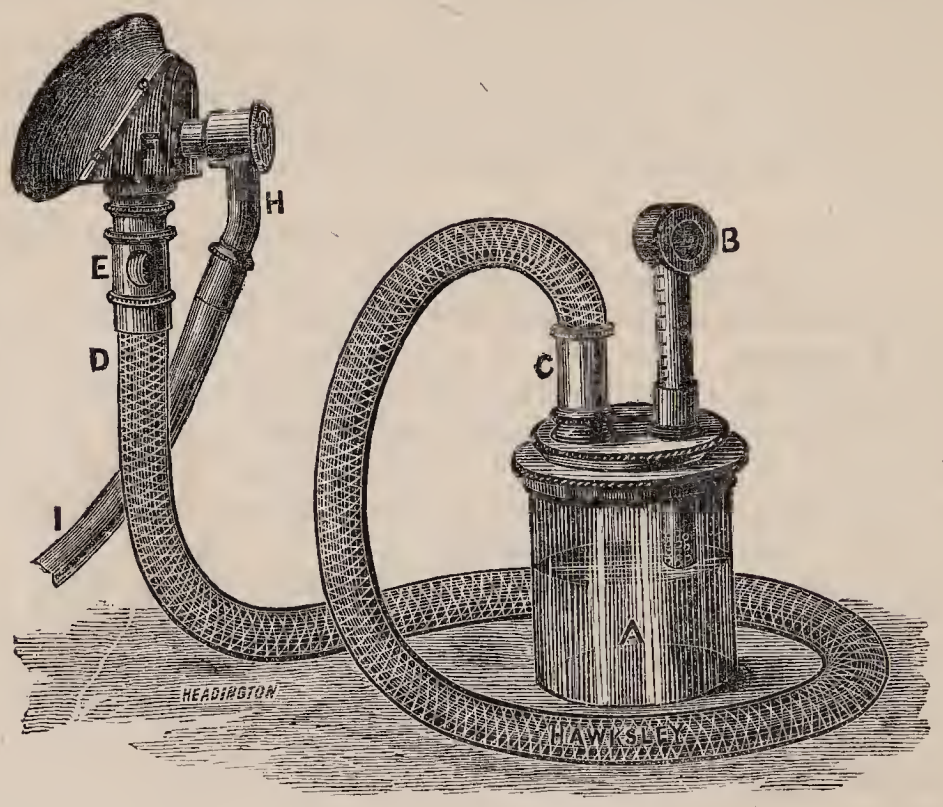
The disadvantages of ether are, the pungency of its vapour, the somewhat noisy excitement which sometimes occurs during recovery from its effects, and the amount of salivary secretion which it excites. The last is a very decided inconvenience in plastic operations within the mouth, but the other two objections are trifling when compared with the comfort of feeling that you are dealing with a safe anæsthetic. In fact, its relative safety should surely be that which should chiefly influence us in the choice of any anæsthetic.

I do not doubt that it is possible to kill a person with ether, and, as I have elsewhere said, it is a mistake to claim for any anæsthetic absolute safety. We can scarcely expect to render a person profoundly insensible without incurring some danger; but it is of great advantage to use an agent the danger from which usually occurs only with sufficient warning to enable us to avert it. This is the case with ether; and I think Mr. Pollock has done both the profession and the public a service in pointing out the responsibility of those who persist in using the more dangerous anæsthetics.—*Lancet, Jan.* 9, 1875, *p.* 68.

104.—NEW ETHER INHALER.

The apparatus consists of a glass chamber (A) capable of holding ten ounces of ether. The sliding tube of the inlet valve (B) is graduated into ounces for the purpose of measuring the consumption of ether. The pipe (C D) conveys the ether vapour to the face-piece (F). The edge of the mask is surrounded by a water-cushion for the purpose of more closely fitting the face. The shutter valve (E) is for regulating the admission of air either at the beginning of an operation or during its progress. The pipe (I) and the valve (H) convey the expired air to the floor. The glass vessel (A) is half immersed in water heated to 100° Fahr. in order to promote a more rapid and equable evaporation of the ether. For this purpose the metal case in which the apparatus is carried is used as a bath, the glass vessel being placed in the cell and surrounded by the warm water. The ether boils at about 96° Fahr., but before

the quantity contained in the chamber (A) has reached that point the temperature of the surrounding water has fallen.



The time required to produce insensibility to pain is from three minutes and a half to four minutes and a half, and about an ounce of ether is used in a quarter of an hour.

The apparatus is manufactured by Mr. Hawksley, of Oxford Street.—*Lancet*, *Feb.* 13, 1875, *p.* 251.

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1872—1874.

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